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JOURNAL *of* EDUCATIONAL RESEARCH

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THE MISLEADING ACCOMPLISHMENT QUOTIENT

WILLIAM R. WILSON
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IT is the purpose of this paper to emphasize certain elementary statistical fallacies upon which rest many of the conclusions based on the use of the accomplishment quotient. A survey of educational writings reveals a widespread belief that bright students are achieving less, relative to their ability, than are dull students. This apparent retardation of bright pupils is shown by an invariable negative correlation between the intelligence quotient and accomplishment quotient; or by the fact that with bright students educational age lags behind mental age, while with dull students it is likely to exceed mental age. These facts are ordinarily taken to indicate that bright students are putting forth relatively little effort while dull students are working nearly, if not quite, to the limit of their ability.

Typical results and conclusions may be cited. Thus McPhail, testing thirteen elementary-school classes in Grades V to VIII, found that the correlations of the accomplishment quotient and the intelligence quotient ranged from —.02 to —.71. From this McPhail concludes that in these facts

> . . . . we have a striking portrayal of the fact that the superior children are not working up to their capacity as well as do the normal children and that the less gifted children exceed both these groups in this respect by doing just what one is justified in expecting of them.[1]

Ruch, after extensive examination of four classes of elementary-school children found negative correlations of .30, .56, .69, and .75

[1] McPhail, Andrew H. "The Correlation between the I.Q. and the A.Q.," *School and Society*, 16: 586-88, November 18, 1922.

between the intelligence quotient and the achievement quotient.[2] Peters, who suggests eleven practical uses for the accomplishment quotient, found in four classes at Ohio Wesleyan correlations of —.29, —.54, —.58, and —.61.[3] And finally, to bring this sketchy summary to a close, Pintner and Marshall, after a large amount of testing in elementary and high schools, say of the achievement-ability relation:

> As a matter of fact we shall see, what we have long suspected and what we have only recently consciously realized, that the greatest amount of waste exists among the brighter pupils in a class or among the better schools in a school system. It is, as a rule, the more intelligent pupils who are working below capacity, even though they are keeping well up to the average level of the group. We have been pushing and cramming the duller children while the brighter have been allowed to loaf. The bright child is the most retarded child in our schools. The dull child is the most accelerated. The bright child is the laziest and the dull child is the most industrious. We are now ready by means of the combined mental and educational tests to equalize the pressure and stimulate equally both bright and dull so that they may work up to their respective capacities.[4]

Since this quotation states an opinion widely held by educators, it is important to scrutinize the facts upon which it is based.

In this paper an attempt will be made to demonstrate, first, that the negative correlation between the intelligence quotient and accomplishment quotient is the result in part of the faulty measures which are used and would exist even if ability and achievement were actually perfectly correlated and, second, that this negative correlation is to be expected even with perfect measures and maximal effort on the part of each pupil. By this is meant that bright students, by our manipulation of figures, are allotted low accomplishment quotients, that dull students by our manipulation of figures are allotted spuriously high accomplishment quotients—together with whatever praise goes with them, that even by an inordinate effort the bright student cannot raise his accomplishment quotient to unity, and that, even if every dull student were

[2] Ruch, Giles M. "The Achievement Quotient Technique," *Journal of Educational Psychology*, 14: 334-43, September, 1923.

[3] Peters, Charles C. "A Method for Computing Accomplishment Quotients on the High School and College Levels," *Journal of Educational Research*, 14: 99-111, September, 1926.

[4] Pintner, R., and Marshall, Helen. "A Combined Mental-Educational Survey," *Journal of Educational Psychology*, 12: 32-48, January, 1921.

as lazy as the bright are commonly believed to be, the accomplishment quotients of this group would still be gratifyingly large.

The classical work on the accomplishment quotient, or ratio, was done by Franzen. Because many erroneous conclusions have been drawn from Franzen's study and because a survey of it will bring out the thesis of this paper, it is worth while to examine his data critically. Typical of the erroneous conclusions from Franzen's study is that of Whipple, who says: "[Franzen] has recently shown that if pupils are pushed to the extreme limit of their ability, the correlation between their educational achievement and their intelligence is not only high but actually reaches unity."[5] Actually, Franzen's study demonstrated the difficulty, if not the impossibility, of raising markedly the correlation of intelligence quotient and school achievement.

Franzen gave Stanford-Binet tests to two hundred children in schools of Garden City. Five standard tests were given the children in November, 1918, in June and November, 1919, and in June, 1920. During the two school years from November, 1918, to June, 1920, every possible means was used to bring the ratio of the efficiency quotient to the intelligence quotient as high as possible. Children were advanced one or more years in the subjects in which their accomplishment ratios were low. A special treatment class was formed where children whose achievement lagged behind their apparent ability were given special attention. Children were promoted whenever it seemed desirable and teachers were changed from one class to another whenever it was believed that the effectiveness of their teaching could be increased.

> The purpose was not to prove that any educational procedure would tend to promote abilities more rapidly than others, but that abilities could be promoted to the level of intelligence—that intelligence is substantially the exclusive inherited determinant of variety of product among school children.[6]

What was the result of this vigorous and long sustained effort to secure a perfect correlation between the intelligence quotient and the efficiency quotient? Certain of the results are of particular

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[5] Whipple, G. M. "Educational Determinism: A Discussion of Professor Bagley's Address at Chicago," *School and Society*, 15: 599-602, June 3, 1922.

[6] Franzen, Raymond. *The Accomplishment Ratio: A Treatment of the Inherited Determinants of Disparity in School Product.* New York, Teachers College, Columbia University, 1922. p. 14 (Teachers College, Columbia University, Contributions to Education, No. 125)

TABLE I

HYPOTHETICAL SCORES ILLUSTRATING SOME ABILITY-ACHIEVEMENT RELATIONS

True Intelligence Quotient	True Efficiency Quotient	True Accomplishment Quotient	Obtained Intelligence Quotient	Obtained Efficiency Quotient	Obtained Accomplishment Quotient
(1)	(2)	(3)	(4)	(5)	(6)
146	146	1.00	148	143	96
142	142	1.00	146	136	93
141	141	1.00	136	142	103
139	139	1.00	140	137	97
138	138	1.00	135	144	107
138	138	1.00	130	139	106
130	130	1.00	133	125	94
122	122	1.00	133	114	85
122	122	1.00	129	122	94
122	122	1.00	116	118	101
121	121	1.00	123	124	95
120	120	1.00	124	119	95
118	118	1.00	115	115	100
117	117	1.00	120	121	100
117	117	1.00	110	126	114
114	114	1.00	113	114	100
109	109	1.00	114	107	93
107	107	1.00	98	103	105
107	107	1.00	108	104	96
104	104	1.00	100	94	94
104	104	1.00	104	109	104
103	103	1.00	97	94	96
101	101	1.00	101	101	101
100	100	1.00	104	102	94
100	100	1.00	100	99	99
99	99	1.00	107	101	101
99	99	1.00	101	97	96
98	98	1.00	91	99	106
98	98	1.00	98	92	93
97	97	1.00	103	99	96
97	97	1.00	87	92	105
97	97	1.00	97	104	107
96	96	1.00	95	96	101
95	95	1.00	105	100	95
95	95	1.00	92	96	104
95	95	1.00	84	94	111
94	94	1.00	101	94	93
94	94	1.00	94	84	89
92	92	1.00	93	96	102
87	87	1.00	83	86	103

TABLE I—(*Continued*)
HYPOTHETICAL SCORES ILLUSTRATING SOME ABILITY-ACHIEVEMENT RELATIONS

True Intelligence Quotient	True Efficiency Quotient	True Accomplishment Quotient	Obtained Intelligence Quotient	Obtained Efficiency Quotient	Obtained Accomplishment Quotient
(1)	(2)	(3)	(4)	(5)	(6)
87.....	87	1.00	87	98	112
84.....	84	1.00	79	73	92
83.....	83	1.00	84	81	96
80.....	80	1.00	79	73	92
80.....	80	1.00	82	80	97
80.....	80	1.00	78	86	110
78.....	78	1.00	84	85	101
60.....	60	1.00	58	68	117

interest. In November, 1918, before motivation began, the correlation between intelligence quotients and the mean of the subject ratios was $-.602$. At the conclusion of the experiment, in June, 1920, the correlation had fallen to $-.493$. The probable errors of these coefficients are .06 and .08, respectively. The difference of .109 between r's each having probable errors larger than one-half the difference is of doubtful significance. As far as Franzen's results go, and contrary to the usual conclusion of which that of Whipple is typical, this negative relation between intelligence quotient and accomplishment ratio was not significantly changed by two years of educational forcing. The tendency of low accomplishment quotients to be associated with high intelligence quotients and of high accomplishment quotients to be associated with low intelligence quotients seemed stubbornly to resist remedial measures. In fact, Franzen's study forces conclusions directly opposed to those typified by the statement of Whipple. It now remains to show that this result is inevitable.

In the section that follows, an elementary proof will be offered that the accomplishment-ratio method involves a manipulation of figures that, first, raise spuriously the accomplishment quotients of students who test below the mean of ability and lower spuriously the accomplishment quotients of students who test above the mean in ability, and, second, force a spurious negative correlation of subject quotients. It will be shown that these effects are obtainable

by the accomplishment-quotient method where all the relations are "ideal," that is, all accomplishment quotients for bright and dull alike are actually equal to 1.00 and the correlation of the intelligence quotient and accomplishment quotient is actually zero.

A hypothetical case will illustrate the four points to be demonstrated and will also explain the anomalies found in Franzen's results. Forty-eight pupils were in Franzen's group that completed two years of motivation. Let us take the intelligence quotients of these pupils as Franzen reports them and assume that they are perfect measures representing without error the ability of the pupils to do school work. Let us further assume that in this school an "ideal" relation obtains between the intelligence quotient and efficiency quotient, so that each child's intelligence quotient is also his efficiency quotient. The perfect intelligence quotients are shown in Column 1 of Table I and the perfect efficiency quotients in Column 2. The resulting true accomplishment quotients are all 1.00 and are shown in Column 3.

In practice, however, the intelligence quotient and efficiency quotient are measured by fallible scales, and thus obtained accomplishment quotients are not the true accomplishment quotients. To simulate the kind of intelligence quotients and efficiency quotients that one would obtain by actual testing, let us distribute, purely at random, errors among the true measures. In order to err on the side of conservatism let us make these errors much smaller than we could hope for them to be in practice (see Table II). These errors, distributed at random through our perfect intelligence quotients and efficiency quotients give us the "obtained" scores of Columns 4 and 5. These fallible scores correlated .96 with the true scores and are thus vastly more reliable than any scores obtained in practice. One-half the fallible scores lie 3 points or less from the true scores.

We can now obtain hypothetical accomplishment quotients from the fallible scores by dividing the efficiency quotients by the intelligence quotients. The true accomplishment quotients are all 1.00, but the obtained accomplishment quotients range from 85 to 117. Remembering that with our perfect measures the correlation of intelligence quotients and accomplishment quotients is zero, we obtain the correlation using our imperfect measures; and it turns out to be

−.38. By the introduction of small chance errors into our perfect scores, we make the bright pupils seem lazy and the dull pupils seem diligent! No wonder that working with measures far less reliable investigators find negative correlations averaging about .50 between the intelligence quotients and accomplishment quotients.

The pitfalls, in the interpretation of the correlation, if imperfect measures of a kind similar to these were used, have been pointed out by a number of investigators. Attention should be directed particularly to the papers of Thorndike[7] and Thomson[8] on the interpretation of the correlation of initial and final scores in learning experiments and the paper of Toops and Symonds[9] which demonstrates that the correlation of the intelligence quotients

TABLE II

ERRORS DISTRIBUTED AMONG INTELLIGENCE QUOTIENTS AND EFFICIENCY QUOTIENTS

Size of Error	Number of Occurrences	Size of Error	Number of Occurrences	Size of Error	Number of Occurrences
(1)	(2)	(1)	(2)	(1)	(2)
11	1	3	2	−5	2
10	1	2	3	−6	2
9	1	1	4	−7	2
8	1	0	6	−8	1
7	2	−1	4	−9	1
6	2	−2	3	−10	1
5	2	−3	2	−11	1
4	2	−4	2		

and accomplishment quotients must be negative. A simple proof of this statement is offered under Figure 1.

The measures of ability and achievement now in use fall far below the hypothetical measures in validity and reliability. Since their validity is not known and their reliability is known to be, as a rule, less than that indicated by a self-correlation of .90, they cannot safely be assumed to tell with definiteness anything concerning the true accomplishment quotients of the students mea-

[7] Thorndike, E. L. "The Influence of the Chance Imperfections of Measures upon the Relation of Initial Score to Gain or Loss," *Journal of Experimental Psychology*, 7: 225-32, June, 1924.

[8] Thomson, Godfrey H. "A Formula to Correct for the Effect of Errors of Measurement on the Correlation of Initial Values with Gains," *Journal of Experimental Psychology*, 7: 321-24, August, 1924.

[9] Toops, H. A., and Symonds, P. M. "What Shall We Expect of the A.Q.?" *Journal of Educational Psychology*, 13: 513-28, December, 1922.

sured. If it can be shown that lack of reliability of the scales account for all the anomalies found, it is not necessary to look further.

Let us now assume that the millenium of the teacher and the tester has arrived. Every school child works to the limit of his ability, and both ability and achievement are measured by the tests perfect in validity and reliability. The resulting accomplishment

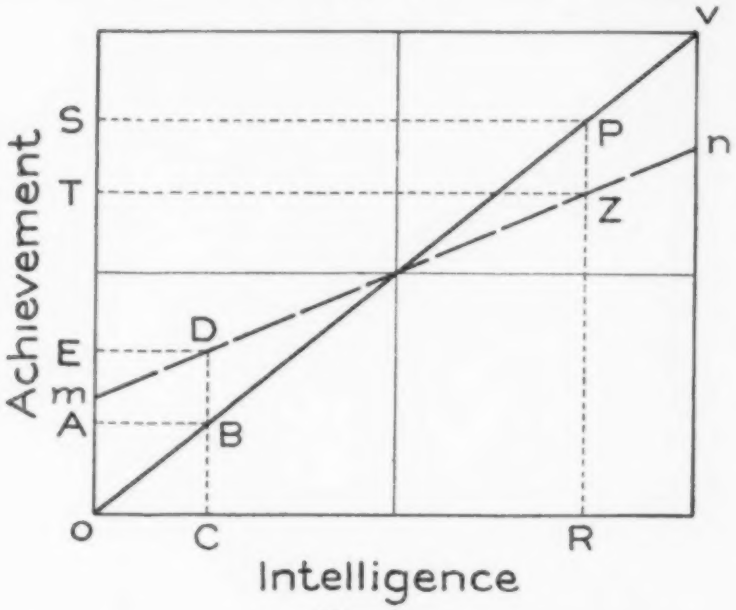

Figure 1

OV is the regression line if the correlation of ability and achievement is 1.00. The measures, however, are never perfect and even though the correlation of perfect measures may be 1.00 the equation for the regression line will contain an r less than 1.00. Assuming that *MN*, an actual regression line, bisects the vertical arrays, we have:

$$\text{If } r = 1.00,\ AQ = \frac{BC}{AB} = 1.00$$

$$\text{If } r < 1.00,\ AQ = \frac{DC}{DE}$$

Since $DE = AB$, and $DC = BD + BC$

$$AQ = \frac{BC + BD}{AB} > \frac{BC}{AB} > 1.00$$

Similarly with a high *IQ*

$$\text{If } r = 1.00,\ AQ = \frac{PR}{SP} = 1.00$$

$$\text{If } r < 1.00,\ AQ = \frac{RZ}{TZ}\ \frac{RP - PZ}{SP} = \frac{RP}{SP} < 1.00$$

These relations will hold without regard to the nature of the factors that bring about imperfect correlation.

quotients of the bright students will still be low, the dull students will still seem to be accomplishing more than their intelligence would warrant, and the correlation of the intelligence quotients and accomplishment quotients will still be negative.

Let us consider the ratio,

$$\frac{EQ}{IQ} = AQ.$$

The intelligence quotient in the denominator is assumed to summarize all the factors that determine school achievement. But does it? A thousand factors inextricably mingled determine school achievement. They include—to name only a few largely out of control of the classroom teacher—health, home surroundings, sensory acuity, nutrition, and personality. These conditions and the multitude of similar ones are not, of course, "units." They are capable of indefinite subdivision, and they enter into the most intricate relations with each other. A reasonable denominator for the accomplishment-quotient ratio would include every irremovable factor that influences achievement. Letting I stand for the abilities measured by the intelligence test and A, B, C, D,...n for these other factors, the denominator would become IABCD...n. In Franzen's highly motivated group the factors ABCD...n contributed more to achievement than did I.

What is the effect of ignoring everything except I as is done in the conventional accomplishment-quotient methods? Since ABCD...n is to a large extent uncorrelated with I, if I is large the other factors determining possible achievement will be relatively small. The rank of a bright child in possible achievement will be high only if his rank in all these other factors is also high. In spite of certain low positive correlations, however, the brightest children are not also the healthiest, most encouraged at home, best nourished, and least handicapped by disorders of personality. Thus, the accomplishment-quotient method sets too high a standard for the child with a high intelligence quotient. With the dull child the reverse is true. His rank in the other determinants of achievement is likely to be much higher than his rank in intelligence. If all these other factors were taken into account his accomplishment quotient would be decreased.

In view of the foregoing, what can be said of the achievement relative to the ability of bright and dull students? The question is a puzzling one. As has been shown, the pecularities of correlation or unreliable scores and grades are alone sufficient to account for all the results thus far obtained. In fact, in our hypothetical case, if we reduce the reliability of our measures to approximately what they are in educational practice, the negative correlation of the intelligence quotient and accomplishment quotient becomes so large that one is tempted to wonder by what means bright students are able to maintain their accomplishment quotient at the present level. This mystery deepens when one considers also the fact that intelligence cannot be made the sole determinant of achievement. The conclusion seems irresistible that the conventional statements concerning the accomplishment quotient are in need of modification.

Certain assumptions that are at least questionable are involved in the use of the accomplishment quotient. Three of the most important will be listed without comment. They are, first, that there is a "general ability" which can be made the sole determinant of school achievement, second, as a corollary, that special abilities and qualitative differences in ability do not exist, and third, that this general ability can be completely stated by a single figure.

CONCLUSION

1. The unreliability of the measures upon which the accomplishment quotient is based is alone sufficient to account for the negative correlation between the intelligence quotient and accomplishment quotient.

2. Since the intelligence quotient is not the sole determinant of possible achievement, its use in finding the accomplishment quotient results in too high an expectation for bright students and too low an expectation for dull students.

3. Conclusions based on the use of the accomplishment quotient are misleading unless they take into account the reliability of the measures employed, the validity of the measures employed, and the part played by factors determining the intelligence quotient in school achievement under conditions of maximum motivation.

COMBINED WORD STUDIES

EDWARD WILLIAM DOLCH
University of Illinois

FOR many years investigators have been trying to determine which words are most frequently used by children or by adults or are most commonly found in various kinds of reading-matter. The report of each has been significant, but no single one has been of as great scope as could be desired. Several combinations of the studies have been made, but the largest word studies[1] have never been included in them. Consequently, it seemed necessary to reassemble all the data so as to get a word list which would include all the evidence regarding the words of our language which are most commonly used. This we have called the Combined Word Study List. It is to be used as the basis for a formulation of vocabularies for each grade from the first to the eighth inclusive.[2] Any steps toward such a grading of words is of wide educational interest and importance; and, for that reason, the sources and character of this Combined Word Study List will be briefly described.

SOURCES OF THE LIST

Fifteen word studies were combined in this list. These do not include all the material that might have been found, but they do contain that which seemed to be the most important for our purpose. Three sorts are included: studies based on children's speech or writing, studies based on adults' letters, and studies based on reading-matter. Some of the studies comprise more than one of these types of material.

Since the ultimate purpose was the establishment of grade vocabularies, the reader may wonder why material was taken from adult sources. The reason is that as much data as possible upon every word was sought. The grading given by the children's studies could not be accepted as final because of the inevitable error of sampling

[1] Thorndike's *Word Book*, Horn's Writing Vocabulary, and the Free Association List. See detailed description later.

[2] This work was also subsidized as a contribution to education by the publisher who supported the Free Association Study.

and because of the presence or lack of suggestion made to the children by the ways in which the words were secured. Consequently, the frequency with which words were found in the writing of adults or in reading-matter might have a decided bearing on the grade-placement of many words. A further reason for use of adult sources was that they were quite certain to fill in obvious gaps that have been left by the children's studies. Most of the words which are very common with adults are also well known to children, and many of these had been missed by the children's studies. For these reasons, the most important studies from all these fields of use were combined. These studies are briefly described in the next paragraphs.

"The Commonest Words in the Spoken Vocabulary of Children up to and Including Six Years of Age" by Ernest Horn (*Twenty-Fourth Yearbook of the National Society for the Study of Education*, Part I, Chapter VII, 1925).

This list includes words gathered from children's speech. The published list gives only 1,082 out of the 5,000 different forms found, but Dr. Horn kindly loaned us the original data so that we could include an additional group of words of high frequency.

Free Association Study of Children's Vocabularies by the writer is reported in "Grade Vocabularies" (*Journal of Educational Research*, 16:16-26, June, 1927).

Children in Grades II to VIII inclusive wrote all the words they could think of in fifteen minutes.

Concrete Investigation of the Material of English Spelling by W. F. Jones, (University of South Dakota, December, 1915).

Children in Grades II to VIII inclusive wrote themes on assigned subjects which were planned to cover their fields of experience.

Survey of the Writing Vocabularies of Public School Children in Connecticut by W. F. Tidyman (United States Bureau of Education Teacher's Leaflet No. 15, November, 1921).

The words taken from "spontaneous" compositions in Grades III to IX inclusive were used as the source of this list.

"Spelling Vocabularies of Children in the Elementary School" by H. J. Smith (University of Wisconsin, Department of Education, Seminary in Education, 1912-13, unpublished).

This list includes the words found in children's compositions on self-selected topics, Grades III to VIII inclusive.

"Common Essentials in Spelling" by C. K. Studley and Allison Ware Chico [California] State Normal School (1914, Bulletin No. 7).

Words found in children's "written school exercises" comprise this list. It also includes Ayres' List of 542 words and was somehow checked with a list from adult letters. It was graded by usage with "modifications to correct manifest incongruities."

Essentials of Spelling by H. C. Pearson and Henry Suzzallo (New York, American Book Company, 1919).

"Thousands of children's compositions from the Horace Mann School and other schools" were the sources of this list, and "use was made of the scientific studies of Jones, Ayres, Pryor, Eldridge, Smith, Woolfolk, Cook and O'Shea, and Chancellor." The words of this list are "graded on the basis of their use by children in written compositions."

The New Orleans Public School Spelling List by Nicholas Bauer (New Orleans, F. F. Hansell and Brothers, 1916).

The words of this list were taken from children's themes on ninety assigned subjects which were intended to cover the life and activities of children. The list was graded not on usage but on frequency.

A Basic Writing Vocabulary by Ernest Horn (University of Iowa Monographs in Education, First Series No. 4, April 1, 1926).

This list includes "the 10,000 words most commonly used in writing." It is based on 5,137,000 running words, exclusive of proper nouns, chiefly from adult correspondence.

The Child and His Spelling by W. A. Cook and M. V. O'Shea (Indianapolis, Bobbs-Merrill, 1914).

This list was made from the words found in personal letters of adults.

Determination of a Spelling Vocabulary Based upon Written Correspondence by W. N. Andersen (University of Iowa Studies in Education, Vol. II, No. 1, 1917).

The words in this study were taken from letters of adults.

"Analysis of the Vocabulary of Thirty-Seven Primers and First Readers" by H. W. Kircher (*Twenty-Fourth Yearbook of the National Society for the Study of Education*, Part 1, pp. 193-98, 1925).

This list contains the combined vocabularies of thirty-seven primers and first-year reading books.

Relative Frequency of English Speech Sounds by Godfrey Dewey (Cambridge, Harvard University Press, 1923).

In the attempt fully to cover modern usage, the words of this list were taken from newspapers, modern fiction, speeches, letters, advertising, and magazines.

A Reading Vocabulary for the Primary Grades by A. I. Gates (New York, Teachers College, Columbia University, 1926).

This list is based on Thorndike's Commonest 2,500, a count of children's literature, Packer's vocabulary of ten first Readers (*Twentieth Yearbook of Society for Study of Education*, Part II, Chapter IX), and Horn's list already

described. It is presumed to be for Grades I and II, but it is only partly based on use.

The Teacher's Word Book by E. L. Thorndike (New York, Teachers College, Columbia University, 1921).

The list given in this book is derived from literature for children, the Bible and English classics, textbooks, books on various industries, newspapers, and correspondence. The words are not graded.

TABLE I

SOURCES OF COMBINED WORD STUDY LIST

Studies	Running Words Studied	Different Words or Forms	List as Published	Omitting Duplication and Proper Names
(1)	(2)	(3)	(4)	(5)
Children's Use:				
Children's Vocabulary (Horn)	.....	5,000	.....	1,825
Free Association Study	2,312,200	12,622	9,583	9,583
Jones	15,000,000	4,700	4,532	2,709
Tidyman	538,500	.....	3,000	2,448
Smith	75,000	2,050	2,050	2,029
Studley-Ware	200,000	3,470	3,932	3,483
Pearson-Suzzallo	.....	.....	2,049	1,968
Bauer	.....	19,000	3,037	2,191
Adults' Use:				
Writing Vocabulary (Horn)	5,137,000	36,363	10,000	6,426
Cook-O'Shea	200,000	5,200	2,970	2,875
Andersen	361,184	9,223	3,087	2,467
Reading-Matter:				
Kircher	.....	.....	863	715
Dewey	100,000	10,161	1,214	1,166
Gates	.....	.....	1,500	1,158
Thorndike	4,565,000	20,000	10,000	9,100

The amount of data included by these studies is shown by Table I. The columns of figures are not complete, because the items are not given concerning some of the lists. Attention is especially called to the last column which shows the net total for each list after we eliminated from it proper names and duplications. That is, after omitting proper names, we reduced the list to what may be called a dictionary basis by combining inflectional forms. The two variations from this basis were that adverbs in *-ly* were combined with the adjectives, and irregular forms of verbs were retained separately. This process of reducing to a common basis changed the

totals for some lists greatly. In the case of Thorndike's list, the reduction is almost altogether due to omission of proper nouns, since Thorndike practically had used a dictionary basis in his compilation.

A glance at Column 2, *Running Words Studied*, will show that a truly enormous amount of material was included. In each of the three divisions, there is one very large study: the Free Association in the group based on *Children's Use*, Horn's Writing Vocabulary among those based on *Adults' Use*, and Thorndike's List of those based on *Reading-Matter*. Jones states that he tabulated a large number of running words, but his published list is so small as not to compare with the others.

Some interesting suggestions as to size of vocabularies are given by the figures in Column 3 which show the number of different words or forms. The Free Association Study found 12,622 different words (dictionary basis) used by children of the elementary grades. Bauer found 19,000 but this includes proper names and inflectional duplications, the omission of which would reduce the total to perhaps 15,000. In the group based upon adults' use, Horn reported a total of 36,363 forms used. If these were reduced to the same extent as his published 10,000 by omission of inflectional duplication, the vocabulary based on adults' use would total 23,366 words. Thorndike found 20,000 words in his reading-matter.

Though Horn's Writing Vocabulary is the largest, we may credit its small preponderance to the million extra running words covered by the study. In fact, we are inclined to think that if Thorndike's material had included more of the popular scientific material that is so commonly read today, his number of different words might easily have been doubled. Grinstead found in his count of a sampling of pages in the *Encyclopedia Britannica*, popular magazines, and textbooks a total of 57,726 different words.[3]

RESULT OF THE COMBINATION

The interesting question, To what extent do these fifteen studies cover the same ground and to what extent do they not? is partly answered by the following tabulation which shows how many

[3] Grinstead, W. J. "On the Sources of the English Vocabulary," *Teachers College Record*, 26:33-46, September, 1924.

words, excluding all proper names, are common to all lists or to any number of them:

Number of Studies	Number of Words
1	4,141
2	2,145
3	1,384
4	1,000
5	712
6	562
7	471
8	407
9	341
10	304
11	316
12	296
13	263
14	239
15	24
Total	12,605

It may at first seem strange that only 24 words appear on all the lists, but this is caused by the fact that, since many of the studies were made for purposes of spelling, a group of the very shortest and simplest words were omitted. The grouping by approximate thirds is more significant to consider: 4,141 words appeared only once; 4,529, two, three, or four times; and 3,935, five or more times. These figures show that about one-third appeared in one study only; about one-third in two, three, or four studies; and about one-third in five or more. This does not seem to be much overlapping. Of course, as Table I shows, five studies had less than two thousand words, six studies had two thousand to three thousand, and only four had more than three thousand words. Since the list by Thorndike, the Free Association List, and Horn's Writing Vocabulary were so large, one would expect that these would greatly overlap many of the small studies and, consequently, give more duplication than has been shown.

It is interesting to note the location of the 4,141 words that appeared on only one of the fifteen lists and on no other. The numbers of words in each list which appeared only once in the Com-

bined Word List and that in the list designated are enumerated in the following tabulation:

	Number of Words
Children's Use:	
Children's Vocabulary (Horn)	22
Free Association Study	1,804
Jones	47
Tidyman	10
Smith	25
Studley-Ware	45
Pearson-Suzzallo	0
Bauer	49
Adults' Use:	
Writing Vocabulary (Horn)	529
Cook-O'Shea	20
Andersen	8
Reading-Matter:	
Kircher	0
Dewey	1
Gates	4
Thorndike	1,577
Total	4,141

The largest group, 1,804, was written by the children for the Free Association Study. Since the children were allowed to write any words they recalled, they ranged over an enormous field of experience that was not included in the letters of the adults or the more classic material of Thorndike. The next largest group was the 1,577 words that appeared on Thorndike's list only. Such a group was to be expected since the study of literature was bound to include many words not common in our present-day speech or writing. The other large group, 529, Horn's Writing Vocabulary, chiefly includes words about adult life which one would not expect children to use and which would not appear in the type of literature which Thorndike tabulated.

The figures contained in this table indicate that the range of language which is coextensive with human experience is wide indeed. Although the standard dictionaries advertise contents of four hundred thousand words, we readily dismiss the bulk of this great number as "technical." The fact seems to be that the average person uses words from many technical vocabularies. Even young children have, at least, a slight acquaintance with many fields of vocation or avocation and even with many fields of science. Though there is a core of general vocabulary, this core is rather

small and rather unimportant since it is quickly learned through conversation and the simplest reading.

The school is more concerned to branch out into all the fields of human endeavor. This process starts early and goes on at a great pace. There are at once a spread and a scattering of vocabulary, as individuals fail to have experiences identical with those of others. This scattering is well shown by a comparison of word studies. The obvious moral is that, if it is to be worth while, experience should be common to all. That is, the core should be expanded so that we perhaps might have a general vocabulary and a common technical vocabulary. Better planning of courses of study and more careful choosing of children's reading will certainly have this effect.

A further phase of the problem is shown in the next tabulation which gives a count of the Combined Word Study List by types of studies. The words of this list may be classified according to the sources from which they were obtained, as follows:

	Number of Words
From all three sources	5,413
Children's use only	2,183
Adults' use only	655
Reading-matter only	1,588
Children's use and that of adults	564
Children's use and reading-matter	1,760
Adults' use and reading-matter	444
Total on children's list	9,920
Total on adults' lists	7,076
Total on reading matter	9,203

The first interesting feature of this summary is that the total of words in each group practically corresponds with the size of the largest study in it. The Free Association Study includes all but about four hundred of the children's words; Horn's Writing Vocabulary omits about six hundred of the words used by adults; and Thorndike's list leaves out about one hundred of the words from reading-matter (see Table I). Yet the minor studies in children's use are important because they help to grade the words—and the grading of the individual word is the purpose of this study.

The overlapping of the groups is influenced by the small number of words listed as used by adults. The number common to the

three types of sources is 5,413, which includes all but 1,663 of the words used by adults. About one-third of these words appear on the list of no other group, and the rest are divided about evenly between children's use and reading-matter. This distribution perhaps represents the real situation since adults, at times, do discuss matters common to children's interests; and they also do use "book language." Undoubtedly, some of the affairs of adults do not concern children and would not easily appear in printed matter. Or, it may be that the situation would be changed, if Horn had published ten thousand words on a dictionary basis instead of ten thousand commonest forms as he did.

Though one may be impressed by the mass of material here gathered, it is clear that the tabulation of words is not yet completed. We do not have nearly enough information regarding the actual knowledge of words at different ages or possessed by various groups, nor do we know how language is affected by the different purposes for which it is used. Yet one thing is evident, any further study in this field should be carefully planned to supplement rather than to repeat what we already have. Above all, we want to know what words are appropriate to each level of the school system. Our school must be graded, and all books must be planned for certain grades. This does not mean merely children's use in each grade, for we must look ahead toward the children's future needs of language and make a sort of graded connection between their environment and the larger environment to which they are destined to go. This process requires some thought regarding the curriculum and not mere statistical records. A broad view of all the factors in the situation is necessary, particularly of the psychology of language. This summary of existing data is intended to encourage others to study the vocabularies of children so that we may get results which will help us in adapting the work of the school to its pupils to whom we are trying to bring the world with which they should come in contact.

EQUALIZATION OF SERIAL BOND PAYMENTS

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With an introduction by Carter Alexander

INTRODUCTION

IN planning bond issues, a problem which every superintendent must face several times in his career, it is a great convenience to allow approximately equal annual payments for all the expenses of the issue. School authorities can then, in their estimates for future years, easily allow a fixed sum for debt service; but they have much labor and worry when they must allow for varying amounts in different years.

The type of bond which permits such convenient handling is the serial bond with approximately equal payments for redemption and interest combined. These payments may be made approximately equal, although manifestly the interest will be larger in the early years and smaller in the later years.

The determination of the suitable total annual payment, not to mention the part of it going toward payment on the principal, is a complicated mathematical procedure if done accurately. Consequently, school men have up to the present been satisfied to use the trial-and-error process for roughly approximating equal payments. Even this trial-and-error method takes much time and labor. Schedules arrived at by such methods will be found in the surveys of Tampa, Providence, Port Arthur, and Beaumont issued by the Division of Field Studies in the Institute for Educational Research at Teachers College. They also appear in such books as Fowlkes's *School Bonds*. The attempt to apply these tables in subsequent surveys, however, has proved impossible when the term of years or rate of interest varied.

Some solution of the problem seemed necessary, by which a superintendent could easily calculate the total payments—payments on principal and the interest for bond issues of different lengths of term and rates of interest. Accordingly, this problem

was put to the students of the First Major Course for Superintendents at Teachers College, in the spring of 1927. R. L. Johns and R. W. Holmstedt of this class found the solution independently. This article tells of the result.

The first part of the article gives the tables and directions for their use, all a busy superintendent needs for immediate application. By means of these, when he knows the size, the term, and the rate of interest of a proposed bond issue, he can quickly and easily determine the approximately equal annual payments for handling it by the serial-bond plan.

The second part of the article gives the mathematical formulas used in building the tables. This part will be useful to those who have bond issues at unusual rates of interest not listed in the tables. The readers concerned with the mathematical theory back of the solution of the problem will also want to know the derivation of the formulas involved.

The authors are thoroughly aware that the laws of some states prevent equal total payments on bond issues. But, there is a sufficient number of states in which equal total payments are legal to give the tables considerable use.

CALCULATING PAYMENTS ON SERIAL BONDS

The three tables given in this article provide a method of calculating payments on serial bonds with approximately equal annual payments for principal and interest combined. Table I lists the indices for finding the initial payment on bond issues of different lengths of term and different rates of interest. When using this table the amount of the bond issue in dollars is multiplied by the index corresponding to the term of duration and the rate of interest.

Table II provides a means of finding any yearly payment on the principal for bond issues of different terms and rates of interest. In order to determine such yearly payments, the initial payment obtained from Table I must be multiplied by the index corresponding to the year concerned and the rate of interest set. This table may serve to facilitate the computation when a calculating machine is used. If the amount of the first payment obtained from Table I is set up in the machine, the other payments may be reckoned by using the indices given in Table II. If calculating

TABLE I

INDICES FOR FINDING INITIAL PAYMENT ON PRINCIPAL

TERM OF BOND	RATE OF INTEREST					
	3.5 Percent	4 Percent	4.5 Percent	5 Percent	5.5 Percent	6 Percent
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
2	.49140	.49020	.48900	.48780	.48662	.48544
3	.32193	.32035	.31877	.31721	.31565	.31410
4	.23725	.23549	.23375	.23201	.23029	.22859
5	.18648	.18463	.18279	.18095	.17918	.17740
6	.15267	.15076	.14888	.14702	.14518	.14336
7	.12854	.12661	.12470	.12282	.12096	.11913
8	.11048	.10851	.10661	.10047	.10029	.10104
9	.09644	.09449	.09257	.09069	.08884	.08702
10	.08524	.08321	.08138	.07950	.07767	.07587
11	.07609	.07415	.07225	.07039	.06857	.06675
12	.06848	.06655	.06467	.06283	.06103	.05928
13	.06206	.06014	.05826	.05646	.05468	.05296
14	.05656	.05467	.05282	.05102	.04928	.04758
15	.05182	.04994	.04811	.04634	.04463	.04296
16	.04768	.04582	.04402	.04227	.04058	.03852
17	.04404	.04220	.04042	.03866	.03704	.03544
18	.04082	.03899	.03724	.03555	.03392	.03236
19	.03794	.03614	.03441	.03274	.03115	.02962
20	.03536	.03358	.03188	.03024	.02868	.02718
21	.03304	.03128	.02960	.02800	.02646	.02505
22	.03093	.02920	.02755	.02594	.02447	.02305
23	.02844	.02731	.02568	.02414	.02267	.02128
24	.02727	.02559	.02399	.02247	.02104	.01968
25	.02567	.02401	.02244	.02095	.01955	.01823
26	.02421	.02257	.02102	.01955	.01819	.01690
27	.02285	.02124	.01966	.01829	.01695	.01513
28	.02160	.02001	.01852	.01712	.01581	.01459
29	.02045	.01888	.01741	.01605	.01477	.01358
30	.01937	.01783	.01639	.01505	.01380	.01265
31	.01837	.01686	.01544	.01413	.01292	.01179
32	.01744	.01595	.01456	.01328	.01209	.11100
33	.01657	.01510	.01374	.01249	.01133	.01027
34	.01576	.01431	.01298	.01173	.01063	.00960
35	.01500	.01357	.01227	.01011	.00997	.00897
36	.01428	.01288	.01161	.01004	.00937	.00839
37	.01361	.01223	.01010	.00983	.00880	.00786
38	.01298	.01163	.01004	.00928	.00827	.00736
39	.01239	.01106	.00986	.00875	.00778	.00689
40	.01183	.01052	.00934	.00765	.00732	.00646

tables are used, the three factors—(1) the amount of the bond issue, (2) the term-and-interest-rate index from Table I, and (3) the year-and-interest-rate index from Table II—should be multiplied directly.

TABLE II

INDICES FOR FINDING ANY YEARLY PAYMENT ON PRINCIPAL

TERM OF BOND	RATE OF INTEREST					
	3.5 Percent	4 Percent	4.5 Percent	5 Percent	5.5 Percent	6 Percent
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
2	1.03500	1.04000	1.04500	1.05000	1.05500	1.06000
3	1.07123	1.08160	1.09203	1.10250	1.11303	1.12360
4	1.10872	1.12486	1.14117	1.15763	1.17425	1.19105
5	1.14753	1.16985	1.19252	1.21551	1.23883	1.26248
6	1.18769	1.21664	1.24618	1.27629	1.30607	1.33823
7	1.22926	1.26531	1.30226	1.34010	1.37885	1.41852
8	1.27228	1.31592	1.36086	1.40711	1.45469	1.50363
9	1.31681	1.36856	1.42210	1.47747	1.53470	1.59385
10	1.36290	1.42330	1.48609	1.55134	1.61911	1.68948
11	1.41060	1.48023	1.55296	1.62891	1.70816	1.79085
12	1.45997	1.53944	1.62284	1.71036	1.80211	1.89830
13	1.51107	1.60102	1.69587	1.79588	1.90123	2.01220
14	1.56396	1.66506	1.77218	1.88567	2.00580	2.13293
15	1.61870	1.73166	1.85193	1.97995	2.11612	2.26091
16	1.67535	1.80093	1.93527	2.07895	2.23251	2.39656
17	1.73399	1.87297	2.02236	2.18290	2.35530	2.54035
18	1.79468	1.94789	2.11337	2.29205	2.48484	2.69277
19	1.85749	2.02581	2.20847	2.40665	2.62151	2.85434
20	1.92250	2.10684	2.30785	2.52698	2.76569	3.02560
21	1.98979	2.19111	2.41170	2.65333	2.91780	3.20714
22	2.05943	2.27875	2.52023	2.78600	3.07828	3.39957
23	2.13151	2.36990	2.63364	2.92530	3.24759	3.60354
24	2.20611	2.46470	2.75215	3.07157	3.42621	3.81975
25	2.28332	2.56329	2.87600	3.22515	3.61465	4.04894
26	2.36324	2.66582	3.00542	3.38641	3.81346	4.29188
27	2.44595	2.77245	3.14066	3.55573	4.02320	4.54939
28	2.53156	2.88335	3.28199	3.73352	4.24448	4.82235
29	2.62016	2.99868	3.42968	3.92620	4.47793	5.11169
30	2.71187	3.11863	3.58402	4.11621	4.72422	5.41839
31	2.80679	3.24338	3.74530	4.32202	4.98405	5.74349
32	2.90503	3.37312	3.91384	4.53812	5.25817	6.08810
33	3.00671	3.50804	4.08996	4.76503	5.54737	6.45339
34	3.11194	3.64836	4.27401	5.00328	5.85248	6.84059
35	3.22086	3.79429	4.46634	5.25344	6.17437	7.25103
36	3.33359	3.94606	4.66733	5.51611	6.51396	7.68609
37	3.45027	4.10390	4.87736	5.79192	5.87223	8.14726
38	3.57103	4.26806	5.09684	6.08152	7.25620	8.63610
39	3.69602	4.43878	5.32620	6.38560	7.64986	9.15467
40	3.82538	4.61633	5.56588	6.70488	8.06965	9.70353

Table III shows the use of Table I in determining the yearly payments on principal and interest for a serial bond issue of $500,000 payable in twenty years at 5 percent interest under the plan of equalization of payments. From Column 6 it appears that the annual payments will range from $40,700 to $39,700 with an annual average payment of $40,130.

TABLE III

THE USE OF TABLE I IN DETERMINING THE YEARLY PAYMENTS ON PRINCIPAL AND INTEREST FOR A TWENTY-YEAR SERIAL BOND ISSUE OF $500,000 AT 5 PERCENT UNDER THE PLAN OF EQUALIZATION ON PAYMENTS

Year	Index Annual Payments on Principal[a]	Smoothed Annual Payments on Principal	Debt Outstanding	Interest for Each Year	Amount of Each Total Annual Payment
(1)	(2)	(3)	(4)	(5)	(6)
1	$15,120	$15,000	$500,000	$25,000	$40,000
2	15,876	16,000	485,000	24,250	40,250
3	16,670	17,000	469,000	23,450	40,450
4	17,503	18,000	452,000	22,600	40,600
5	18,379	18,000	434,000	21,700	39,700
6	19,298	19,000	416,000	20,800	39,800
7	20,262	20,000	397,000	19,850	39,850
8	21,276	21,000	377,000	18,850	39,850
9	22,339	22,000	356,000	17,800	39,800
10	23,456	23,000	334,000	16,700	39,700
11	24,629	25,000	311,000	15,550	40,550
12	25,861	26,000	286,000	14,300	40,300
13	27,154	27,000	260,000	13,000	40,000
14	28,511	29,000	234,000	11,650	40,650
15	29,037	30,000	204,000	10,200	40,200
16	31,434	32,000	174,000	8,700	40,700
17	33,005	33,000	142,000	7,100	40,100
18	34,656	35,000	109,000	5,450	40,450
19	36,389	36,000	74,000	3,700	39,700
20	38,208	38,000	38,000	1,900	39,900
Total	.....	$500,000	.....	$302,600	$802,600
Average	.....	.....	.....	.....	40,130
Range: Highest total payment	.....	.....	.....	.....	40,700
Lowest total payment	.....	.....	.....	.....	39,700

[a]The index payments total a little less than $500,000 due to dropping the sixth of the index number. However, the difference is less than .01 of 1 percent, and it in no way affects the accuracy of the result.

HOW TO USE THE TABLES

1. *To find the initial payment on the principal.*—Table I, of these three tables for calculating payments on serial bonds with approximately equal annual payments for principal and interest combined, is used to find the initial payment on the principal. Examples:

1. To find the initial payment on a fifteen-year bond issue for $100,000 at 3.5 percent interest read across from 15. The index for 3.5 percent (Column 2) is .05182. Since the amount of the issue is $100,000, the initial payment will be .05182 × $100,000 = $5,182.

2. Similarly, a twenty-five-year bond issue for $500,000 at 4 percent interest will cost .02401 × $500,000 = $12,005.

2. *To find the payment on the principal for any given year.*—From Table II may be computed the payment on the principal for any year after the amount of the initial payment has been determined by the use of Table I.

Examples:

1. The fifth yearly payment on the principal for a fifteen-year bond issue of $100,000 at 3.5 percent will be found by reading across from 5. The index for 3.5 percent (Column 2) is 1.14753. Since the amount of the initial payment from Example I in the preceding section is $5,182, the fifth-year payment will be 1.14753 × $5,182 = $5,946.
2. Similarly, the tenth yearly payment on a twenty-five-year bond issue for $500,000 when the rate of interest is 4 percent will be 1.42330 × $12,005 = $17,086.

3. *To smooth payments on the principal to even thousands.*—Since bonds are generally issued in denominations of $1,000, the payments should be smoothed to the nearest thousand. When this is done, add the payments. If this sum is over or under the total for the bond issue, go back to where the largest fraction was dropped or the smallest fraction counted a whole thousand, and adjust until the sum does equal the amount of the bond issue.

Example:

1. The complete procedure for smoothing the payments on the principal of a twenty-year bond issue for $500,000 when the rate of interest is 5 percent is shown in Columns 2 and 3 of Table III.

4. *To calculate the interest for any given year.*—The amount of interest due for any year may be computed by using the proper rate of interest on the amount outstanding for that year.

Example:

1. From Column 5 of Table III, the interest the first year will be .05 × $500,000 = $25,000. For the second year, it will be .05 × $485,000 = $24,250.

5. *To find the total payment for any one year.*—The total amount due for any year will be the sum of the payment on the principal and the interest for that year.

Example:

1. The total payment for the ninth year of the bond issue depicted in Table III is the sum of the $22,000, the payment on the principal from Column 3,

and of the $17,800, interest from Column 5, a total of $39,800 as given in Column 6.

6. *Payments should not vary by more than $1,000.*—The annual total payments should not vary by more than $1,000; if they do, transfer $1,000 in payment on the principal from the highest to the lowest total-payment group.

DEVELOPMENT OF THE FORMULAS USED IN MAKING THE TABLES

A typical case—a $100,000 serial bond issue at 5.5 percent, interest to be carried by equal total annual payments for a term of five years—was selected for computation by R. L. Johns. Simultaneous equations were used to express the different payments.

If

A = first payment,
B = second payment,
C = third payment,
D = fourth payment, and
E = fifth payment,

then the following equations express the relationship of the payments:

$$\$100{,}000 + A = \$100{,}000 - .05A + B$$
$$\$100{,}000 + A = \$100{,}000 - .05A - .05B + C$$
$$\$100{,}000 + A = \$100{,}000 - .05A - .05B - .05C + D$$
$$\$100{,}000 + A = \$100{,}000 - .05A - .05B - .05C - .05D + E$$

When the unknowns are simplified and solved in terms of A these equations become:

$$A = 1.000000A$$
$$B = \frac{21}{20}A = 1.050000A$$
$$C = \frac{441}{400}A = 1.102500A$$
$$D = \frac{9261}{8000}A = 1.157625A$$
$$E = \frac{194481}{160000}A = 1.215506A$$
$$\text{Principal} = 5.525631A$$

Therefore,

$$A = \frac{\text{Principal}}{5.525631}.$$

Now the sum of these payments equals the principal. When the coefficients of A are added and equated to the principal, each subsequent payment equals A, the initial payment, multiplied by the corresponding coefficients of A.

On inspection, however, it is observed that the coefficient for the second payment is the interest rate plus 1; the coefficient for the third payment is the square of the coefficient of the second; the coefficient of the fourth is the cube of coefficient of the second; and so on. It is also observed that A equals the principal divided by the sum of all of these coefficients plus 1.

The initial payment (A) may be stated in the following formula, if

n = the term of the bond,
r = rate of interest, and
Σ = summation sign,

then

$$\text{Initial payment on principal} = \frac{\text{Principal}}{1 + \Sigma(1 + r)^{n-1}}.$$

Each subsequent payment on the principal will be equal to the initial payment times $(1 + r)^{q-1}$ where q is the number of the payment. In other words,

$$q\text{th payment} = \frac{\text{Principal}}{1 + \Sigma(1 + r)^{n-1}} \cdot (1 + r)^{q-1}.$$

By this scheme, the payments on the principal are arranged so that the interest which follows when added each year will equate the payments.

R. W. Holmstedt developed the formula by the use of geometric progressions.

If

K = equalized payment on principal and interest,
S = amount of bond issue,
r = rate of interest,
$P_1, P_2, \ldots P_n$ etc. = the bond payments, and
n = number of payments,

then for the first year

$$K = Sr + P_1,$$

that is, K will equal the interest on principal plus a payment on principal.

Similarly, for the second year

$$K = r(S - P_1) + P_2.$$

That is, K will equal the interest on the outstanding principal plus the second payment on the principal. Then since the first and second payments are "equalized,"

$$Sr + P_1 = r(S - P_1) + P_2.$$

Simplifying

$$P_2 = P_1(1 + r)$$

and therefore the second payment is (1 + the rate of interest) times the first payment. The following payments will increase in a geometric progression, the rate of which will be $(1 + r)$.

In a geometric progression

S = sum,
R = ratio,
A = first number,

then the general formula is

$$S = A + AR + AR^2 + AR^3 + \ldots\ldots\ldots AR^{(n-1)}.$$

Simplifying, the first term,

$$A = \frac{S}{1 + \Sigma_1^n R}$$

Substituting the symbols used in the development of the earlier formulas,

S = principal,
$R = 1 + r$, rate of interest,
$A = P_1$, the first payment,

the equation,

$$A = \frac{S}{1 + \Sigma_1^n R},$$

becomes

$$P_1 = \frac{\text{Principal}}{1 + \Sigma_1^n (1 + r)}$$

$$P_n = \frac{\text{Principal}}{1 + \Sigma_1^n (1 + r)} [1 + r)^{n-1}$$

After the formulas were developed, the next step was to make them usable for the school men. So it was decided to develop a table of indices for bonds ranging from one to forty years in term and from 3.5 percent to 6 percent in interest. The formula for the

initial payment as it stands requires a division by the index number, and for that reason it was rewritten so that the index number could be used as a multiplier for ease of manipulation. The rewritten formula was

$$\text{Initial payment on principal} = \text{Principal} \cdot \frac{1}{1 + \Sigma_1^n (1 + r)}.$$

These formulas were not new, because they were based on the formula for geometric progression. They merely represented a new application which called for a new adjustment.

THE ATTITUDE OF UNIVERSITIES AND COLLEGES TOWARD THE PROBLEMS OF CHILDHOOD

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UNIVERSALLY we admit that the adult life of tomorrow is but the maturing, or in many cases the mere chronological aging, of the childhood of today. We recognize that such outstanding social problems as corrupt politics, capital and labor clashes, divorce, commercialized standards of value and success, and others equally apparent are problems of adult life. Many fail, however, to recognize that adult types not only of physique but also of attitude and behavior are determined largely by the early growth of the child. Yet, if this be true—and evidence in its support is increasing—how are we to make social progress without giving the child a chance to develop qualities that will tend to avoid or to simplify these problems, emanations of character that may kill the disease germs of society?

Admittedly, we know little of the process of child growth. But such experimental studies of the possibilities of child development as those which are being made in Iowa and other child welfare research stations, and at the Merrill-Palmer School, as well as in such educational programs as the Winnetka, Dalton, Montessori and Ontario are encouraging. What responsibility are our colleges and universities assuming in increasing the knowledge of child growth by maintaining laboratory facilities in this field? And what responsibility are they assuming in disseminating the knowledge of child nature already known and in presenting and creating an interest in the problems of childhood? What effort is being made to establish those attitudes toward childhood which are essential for advancement in opportunities for the proper type of child growth? A partial answer to these questions is found in the results of the following analysis of the type and extent of the study of child problems now being made in our higher institutions.

Catalogues of 150 institutions of collegiate grade were examined. These institutions are random sections taken from the alphabetical list given in the *World Almanac*; they include 25 women's colleges, 21 men's colleges, and 104 coeducational institutions;

and, with the exception of 12 institutions such as schools of technology and theological seminaries, they represent either liberal-arts colleges or universities containing liberal-arts courses.[1] Extension and summer-session studies were not recorded.

Examination of the courses listed in biology, education, religious education, home economics, hygiene, physiology, psychology, and sociology showed that the courses dealing with child problems could be classified as follows:

I. Child psychology (mental) including child training and psychology of children's religion.
Child welfare (social) including child labor, juvenile delinquency, infant mortality, community responsibility for child health and recreation.
II. Child care (physical) including health, hygiene, and clothing.
III. Psychology of elementary-school education (educational).
Aims of elementary-school education (educational).
Methods and administration of elementary-school education (educational).

The last type, elementary-school methods and administration, is classed as specialized professional problems and is not included in the summary of results given in this report.[2]

Analysis of these types of child-problem studies shows that they fall into three groups. Group I includes child psychology and child welfare. These studies are pertinent for both sexes and all students, since the majority of people are constantly influencing the development of children. Such influence may be exerted directly, as parent, teacher, or social worker; or indirectly, as determiner of the conditions under which children shall grow, for example, as civic administrator, legislator, or employer. Group II is limited to child care which is pertinent only for women; being of interest, however, to all women as home-makers (either their own or other people's homes, as for example, home demonstrators or mothers' club leaders). Group III consists of three educational types which are of interest to teachers and school administrators.

RESULTS AND DISCUSSIONS

Before these types are studied individually, a consideration of the general distribution of courses will be made in Table I. The

[1] The complete list is given at the end of this report. Catalogues for the years 1925-26 or 1926-27 were examined.

[2] Also, because of their specialized character in departments of home economics, courses in child clothing have been omitted.

percents show that men's colleges fall far behind women's colleges and coeducational institutions with a meager 19 percent as compared with 88 and 73, the percents belonging to the other two types respectively. This difference seems far out of proportion to the relative amount of influence which men and women should, and in many cases do, exert on child development; and it will be considered later in more detail.

Computations showing the percent of the total number of investigated institutions which have courses in child problems indicate that over two-thirds, or 68 percent, have at least one such course. However, since this percent tells nothing of the average

TABLE I

GENERAL DISTRIBUTION OF COURSES IN CHILD PROBLEMS

TYPE OF INSTITUTION	NUMBER OF INSTITUTIONS STUDIED	INSTITUTIONS WITH ANY KIND OF CHILD-PROBLEM STUDIES	
		Number	Percent
(1)	(2)	(3)	(4)
Women's	25	22	88
Men's	21	4	19
Coeducational	104	76	73
Total	150	102	68

number of courses per institution, nor of the number of hours per course, it has, and will have, in itself, little meaning until it has been analyzed into its component parts and until those parts have been individually studied.

The proportionate emphasis of the types of studies into which the courses of child problems were classified for the purposes of this study are given in Table II. In this table, Column 3 gives the number of institutions offering the designated courses; Column 2, the number of institutions in which the respective courses might reasonably be expected. Since the types of courses included in Group I, child psychology and child welfare, may be considered as reasonable possibilities in all institutions studied, the percents for these types are based on 150 colleges and universities. Possibilities

TABLE II

PROPORTIONATE EMPHASIS ON DIFFERENT TYPES OF STUDIES

Class	Possible Number of Institutions for Designated Courses	Institutions with Designated Courses		Courses		Credit-Hours		Institutions with Laboratories	
		Number with Courses	Percent of Total Number	Total Number	Average Number	Total Number	Average Number per Course	Number	Percent[a]
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Group I:									
Child psychology	150	82	55	110	1.3	309	2.8	6	7
Child welfare	150	20	13	23	1.2	58	2.5	2	10
Group II:									
Child care	129	30	23	35	1.2	93	2.7	5	17
Group III:									
Psychology of elementary education	138	11	8	13	1.2	39	3.0	.....	.....
Aims of elementary education	138	5	4	5	1.0	16	3.2	.....	.....
Group I	150	90[b]	60	133	1.5	367	2.8	8	9
Group II	129	30	23	35	1.2	93	2.7	5	17
Group III	138	15	11	18	1.2	55	3.1	.....	.....

[a] Computed from the numbers given in Column 3, Institutions with Designated Courses.

[b] The numbers of Institutions for Groups I and III are not equal to the sum of the numbers of the types of each of these groups because some institutions offered courses in more than one type of child problems.

for Group II, child care, would normally seem to include only institutions admitting women. This lowers the basal figure for percentage computation for this group to 129. For Group III the possibilities, which are limited to liberal-arts colleges, number 138.

From Table II, we find that slightly more than half of the institutions, 55 percent, provide for a study of child psychology. This subject should be the basis for all the other courses in child problems and should quite properly be part of the equipment of all college graduates. In educational circles, it is almost universally admitted that the hope for the future of society lies in the childhood of today; and yet in the slightly more than half of our colleges and universities which give this subject there is an average of only 1.3 courses in child psychology with an average of only 2.8 semester credit-hours. Furthermore, the acuteness of social problems, together with the encouraging malleability of early childhood, might seem to justify the laboratory study of the subject; yet only 7 percent of the 55 percent of institutions giving any child psychology offer laboratory facilities.

Lest these figures exaggerate the status of the study of child psychology, it should be added that, of the 55 percent, 25 percent offer an average of *approximately* one course of which this subject is a part. Of the institutions offering a course composed entirely of child psychology, less than 10 percent give laboratory work. Even on this basis, the figure is deplorably low. Finally, on the basis of the 150 institutions studied, not more than approximately 4 percent of our higher institutions are offering courses in child psychology which are vitalized by laboratory work. Similarly, if consideration be limited to courses composed entirely of child psychology, the number of institutions offering the subject drops from 55 percent to 41.

To those who conceive of education as a means for producing social evolution, the figures on the other studies involving child problems should be of interest. First, we may consider courses in child welfare. This study, which without too much radicalism might be suggested as a requisite for all citizens of collegiate caliber, is offered by only 13 percent of our higher institutions with an average of 1.2 courses per institution, and with an average for that one course of 2.5 semester credit-hours. Of these institutions, only

10 percent provide laboratory facilities in the nature of field work. If the courses only partially comprised of child-welfare material are eliminated, the percent providing laboratories becomes 11, while the percent of institutions offering this study drops from 13 percent to 12.

Courses in child care—which admittedly are for women but which from the point of view of home-making, either directly, as a parent, or indirectly, as a leader of mothers' study groups, might easily be expected to be the possession of all college women—are offered in only 23 percent of the institutions open to women. The average amount of study per institution is 1.2 courses of 2.7 semester credit-hours. Laboratory facilities are offered in 17 percent of these institutions. If courses including subject-matter foreign to child care be omitted, the 23 percent drops to 10; and of this group only 15 percent have laboratory facilities.

The psychology of elementary education and the aims of elementary education belong to a more professional field and are primarily pertinent for teachers and educational administrators. With the needs of the field of psychology of elementary education in mind, we may thoughtfully consider the following figures. On the basis of the 138 liberal-arts colleges examined, this subject is offered in 8 percent of our higher institutions with an average of 1.2 courses per institution, and with 3.0 semester hours credit per course. No laboratory facilities are provided.

The claims of the courses in the aims of elementary education are equally strong. How can secondary and college teachers carry on any valuable work of personality development started in preschool and elementary grades unless there is at least a general understanding of those aims? And how can we insure, or even feel that we have provided a fair chance for, the development of integrated adjusted unselfish youth, unless there is continuity and evolution through the system of the work commenced in the earliest school years? The degree of recognition of this particular field of study by our higher institutions is represented in the following figures: 4 percent offer an average of 1.0 course of 3.2 semester credit-hours with no laboratory work. If only institutions giving an unadulterated course in aims are considered, the 4 percent drops to 2. Thus only 8 percent and 4 (or 2) percent respectively offer

these studies seemingly indispensable for teachers anywhere in an educational system.

To summarize the foregoing, the types of child-problem studies were grouped according to the scheme already mentioned and the results thus obtained are given in the lower portion of Table II. As previously stated, child-care courses, which from their nature are normally limited to women, are computed on a basis of those institutions examined which admit women, and psychology of elementary education and aims of elementary education are computed on a basis of liberal-arts institutions. The fact that the last two types, Group III, are pertinent primarily for teachers and educational administrators does not affect the direct comparison of the percent of institutions offering these courses with the percent offering the other two groups, for, since every liberal-arts college is sending out some teachers, every such college should have these courses at least as electives. The difference in the scope of the various fields would hinder direct comparison only in the case of number of students enrolled.

The percents given in the lower portions of Table II, therefore, represent percents of possibilities of the total number which might reasonably be expected to have the respective studies. It is Group I, child psychology and child welfare, with 60 percent which leads in recognition by the universities and colleges; Group II is second, with only 23 percent; and Group III is third, with a meager 11 percent. The proportionate emphasis of groups as expressed by the average number of courses and average number of hours is nearly equal.

This equality is further evidence of the lack of responsibility assumed by our higher institutions in meeting the problems of childhood. When there is adequate analysis of child problems, there will be recognition of the varying scope of studies of childhood; and we may then expect conspicuous inequality of the number of courses among the types. The number of courses in child psychology, a study basic for all other child studies and one pertinent for all college men and women, might be expected to average higher than the number offered in aims of elementary education, a study pertinent primarily for teachers and education administrators.

Proportionate emphasis judged by direct comparison of laboratory courses cannot fairly be made, for Group III does not require

laboratory for effective instruction to the same extent as the other two groups. Of the other two, Group II leads with 17 percent as compared with 9 percent for Group I.

The distribution of the different types of studies according to type of institution is given in Table III. This shows that women's colleges lead in the total percent for each group except Group III. Taken by separate types, women's colleges lead over coeducational

TABLE III

PROPORTIONATE EMPHASIS OF DIFFERENT TYPES OF STUDIES IN DIFFERENT TYPES OF INSTITUTIONS

	Women's		Men's		Coeducational	
	Number	Percent	Number	Percent	Number	Percent
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Group I:						
Child psychology	18	72	4	19	60	58
Child welfare	3	12	1	5	16	15
Group II:						
Child care	9	36	.....	.....	21	20
Group III:						
Elementary educational psychology	2	8	.....	.....	9	9
Elementary educational aims	1	4	.....	.....	4	4
Group I	19	76	4	19	66	63
Group II	9	36	.....	.....	21	20
Group III	3	12	.....	.....	12	12
Total number with courses	22	88	4	19	76	73
Total number without courses	3	12	17	81	28	27
Total number of institutions studied	25	.....	21	.....	104	.....

schools in child psychology in the ratio of 72 to 58. But in child welfare, they fall behind coeducational institutions in the ratio of 12 to 15. The lead by women's institutions is resumed in courses in child care, 36 percent as compared with 20. The percents of institutions with courses in elementary educational psychology and elementary educational aims in women's and coeducational institutions are essentially the same.

The main interest of Table III lies in the revelation of the fact that the only men's institutions possessing child-problem courses are those offering courses in Group I, four offering child psychology and one of these four offering, besides, a course in child welfare. We should not, of course, expect men's colleges to give courses in Group II, child care; but we should certainly recognize that teachers graduating from men's institutions are quite as much in need of studies in the psychology of elementary education and the aims of elementary education as are those teachers who are graduating from women's or coeducational colleges.

The grand total of institutions of each type offering any courses in child-problem studies is striking when represented in percents. The number of women's colleges studied which offer any courses is 88 percent; of men's colleges, 19 percent; and of coeducational, 73 percent. Obviously, the present attitude is that the training of children belongs to women. It is true that the average mother is with her children more hours of the day than the average father. But, considering the fact that many fathers determine family policies in the general treatment of children and of the attitude toward them, and, further, that many men are holding the executive or legislative power of determining environmental factors of child life, this relative percent of women's and men's institutions, 88 to 19, seems far out of proportion to the comparative influence of men and women on child development. Whether this relative recognition by the different types of institutions is the same ratio as is the recognition of the major fields of study to which child problems belong is later considered.

The present attitude of universities and colleges toward studies in child problems is further revealed by the time of giving the courses shown in Table IV which shows that for those courses which indicate in which of the four college years they are offered, the majority fall in the junior and senior years. Combining those offered in one or both of the last two years and comparing them with those offered in one or both of the first two years, the ratio is 56 to 15.

This means that students leaving college before the junior year are likely not to have studied any courses in child problems; yet these are very likely to be the first to have to deal directly with such

problems in their own homes. These figures also indicate that the present attitude in institutions where a course exists is to offer it as an elective during the last two years when major requirements must be met and when broadening interests fill the intellectual horizon with desires for many and varied electives. This is not an argument against all child-problem study during the last two years. Admittedly, there are phases which can be adequately studied only during this more mature period.

It is, however, a revelation that the chance of universal consideration of child problems by college students under the existing

TABLE IV

TIME OF GIVING CHILD-PROBLEM COURSES

Course Type	Freshman	Freshman-Sophomore	Sophomore	Sophomore-Junior	Senior-Junior-Sophomore	Junior	Junior-Senior	Senior
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Child psychology	3	2	5	5	1	.....	25	11
Child welfare	1	.....	.....	.....	1	1	5	.....
Child care	1	.....	1	.....	1	.....	4	6
Psychology of elementary education	1	1	.....	1	1	.....	1	1
Aims of elementary education	.....	.....	.....	.....	.....	.....	1	1
Total[a]	6	3	6	6	4	1	36	19

[a]Divergence between the total number of courses here and those in Table II is explained by the fact that many of the catalogues did not indicate the year in which the course is offered.

attitude of our institutions is negligible. The question is therefore raised as to whether the basic relation of the solution of child problems to social progress does not justify more adequate provision for the dissemination of child-study knowledge and for the establishment of proper attitudes than the mere offering of an average of 1.2 elective courses of less than 3 credit-hours, during the last two years of college.

Before drawing final conclusions concerning the attitude of universities and colleges toward the study of child problems, it is only fair to study the institutions offering no child-problem courses to

determine whether they are institutions which do not recognize the importance of the fields of study of which these problems are a part. Results of an investigation of the number of courses in psychology, education, sociology, and home economics, four major fields to which these studies belong, gave the results contained in Table V.

TABLE V

A Study of Institutions Offering No Child-Problem Courses Showing Their Recognition of Four Major Fields to Which These Studies Belong

Field	Three Women's Institutions		Seventeen Men's Institutions		Twenty-eight Coeducational Institutions		Total Number of Courses	Average Number of Courses
	Number of Courses	Average Number	Number of Courses	Average Number	Number of Courses	Average Number		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Psychology	15	5.0	43	2.5	96	3.4	154	3.2
Education	13	4.3	46	2.7	228	8.2	287	6.0
Sociology	18	6.0	34	2.0	111	4.0	163	3.4
Total...	46	15.3	123	7.2	435	15.5	604	12.6
Home economics	30	10.0	.....	.....	92	3.3	122	3.9*
Total...	76	25.3	123	7.2	527	18.8	726	15.1
Percent of these institutions not recognizing any of these fields	.....	0.0%	.....	23.5%	.....	7.2%	.....	12.5%

*Since men's institutions are not possibilities for home-economics courses, the average is based on a total of women's and coeducational institutions.

As previously stated (see Table I), 32 percent of the 150 institutions studied offer no courses in the study of child problems. But of this number only 13 percent (6 institutions) fail to recognize the fields of study of which child-problem courses are a part. The remaining 87 percent (42 institutions) which offer no child-problem courses average 15.1 courses per institution in four of the major fields to which child studies belong. Eliminating home-economics courses as not being a field common to all three types of institutions, the average falls from 15.1 to 12.6 courses per institution.

Referring to the figures of Table III, we find that the ratio of men's institutions offering child-problem courses to women's and coeducational institutions is as 19 to 76 or .25. And from Table V, we can compute the ratio of men's to women's and coeducational institutions recognizing four of the major fields to which child problems belong, which is as 77 to 94, or .82. This considerable difference between the two ratios indicates that the small percent of men's institutions offering child-problem courses is not merely a reflection of their attitude towards the broader fields of study of which they are a part, but it is evidence that men's institutions have definitely neglected the phases of these fields dealing with childhood.

Analysis according to subject shows that of these four fields education leads with an average of 6.0 courses per institution. Psychology, sociology, and home ecomonics average 3.2, 3.4, and 3.9 courses, respectively. Since home economics cannot be expected as part of the curriculum of men's institutions, analysis of the average number of courses per type of institution is based on figures from only the first three fields, psychology, education, and sociology. Table V shows that women's and coeducational institutions are essentially equal with an average of 15.3 and 15.5 courses respectively. Men's colleges fall behind with an average of 7.2 courses. These figures show, however, that all types of institutions recognize to a considerable degree the three major fields in which child-problem studies are found and which are common to all three types of institutions, women's, men's, and coeducational.

SUMMARY AND CONCLUSIONS

With this recognition by institutions offering no child courses of the fields of study to which these courses belong, it seems justifiable to continue with the following summaries and conclusions.

1. Examination of the catalogues of 150 American institutions of collegiate grade as listed by the *World Almanac* for 1925 shows that about two-thirds (68 percent) of our universities and colleges have at least one course in child problems.

2. Analysis of proportionate emphasis upon different types of studies reveals that more than half of our institutions (55 percent) provide for child psychology. In child welfare, study is offered by 13 percent; in psychology of elementary education, 8 percent;

and in aims of elementary education, 4 percent. In child care, 23 percent of the institutions admitting women provide at least one course.

3. The proportionate emphasis expressed in group totals shows that percents of institutions having courses are of decreasing magnitude from the more general field of child problems to the more specialized: Group I (child psychology, child welfare), 60 percent; Group II (child care), 23 percent; and Group III (psychology, of elementary education, aims of elementary education), 11 percent.

4. The average number of courses per institution and hours per course are 1.8 courses of 2.8 credit-hours.

5. Some form of laboratory work is provided by only 8 percent of the institutions studied.

6. The distribution of courses according to the type of institution indicates that whereas 88 percent of the women's, and 73 of the coeducational institutions studied have some course in child problems, only 19 percent of the men's have such studies.

7. A table showing distribution of courses by type of field and by type of institution, indicates that women's colleges lead in percent of institutions offering one or more courses in child psychology and in child care; that coeducational institutions lead in the percent offering one or more courses in child welfare and elementary educational psychology; that women's and coeducational institutions are equal in the percent of institutions offering elementary educational aims. Men's institutions fall far behind the other two types and offer courses only in the fields of child psychology and child welfare.

8. Analysis shows that only 13 percent of the institutions which do not offer child-problem courses fail to recognize four of the major fields, sociology, psychology, education, and home economics, to which these problems belong.

9. The ratio of men's to women's and coeducational institutions in the percent of institutions which offer child-problem courses is significantly smaller than the ratio of men's to women's and coeducational institutions in recognition of the fields of which child-problem courses are a part. Therefore, the small number of men's institutions offering child-problem courses is not merely a reflection of the attitude of these institutions toward the broader fields of

study to which these courses belong, but is an indication that men's colleges have almost entirely neglected the phases of these fields dealing with childhood.

Because the foregoing analysis has been presented in terms of five different types of child-study problems, it should not be inferred that this investigation carries with it a recommendation that every college graduate should have had at least one course in each of the five types. Obviously, that would be neither practical nor desirable. The purpose of this investigation has been to analyze the present situation of the study of child problems in our higher institutions and thereby more clearly reveal the needs of the field. The organization of courses and research laboratories for child study to meet the needs is a subject necessitating separate consideration. The need for a more extensive representation of such courses and for more laboratory work in them, however, is obvious and striking.

LIST OF EDUCATIONAL INSTITUTIONS

TWENTY-FIVE WOMEN'S COLLEGES

Agnes Scott College, Decatur, Ga.
Adelphi College, Brooklyn, N. Y.
Alabama College, Montevallo, Ala.
Barnard College, New York, N. Y.
Baylor Female College, Belton, Tex.
Beaver College, Jenkintown, Pa.
Bessie Tift College, Forsyth, Ga.
Blue Mountain College, Blue Mountain, Miss.
Blue Ridge College, New Windsor, Md.
Brenau College, Gainesville, Ga.
Bryn Mawr College, Bryn Mawr, Pa.
Cedar Crest College, Allentown, Pa.
Coker College for Women, Hartsville, S. C.
Columbia College, Columbia, S. C.
Connecticut College for Women, New London, Conn.
Elmira College, Elmira, N. Y.
Flora McDonald College, Red Springs, N. C.
Florida State College for Women, Tallahassee, Fla.
Georgia State College, Milledgeville, Ga.
Goucher College, Baltimore, Md.
Judson College, Marion, Ala.
Margaret Morrison Carnegie College, Pittsburgh, Pa.
Texas State College for Women, Denton, Tex.
Vassar College, Poughkeepsie, N. Y.
Women's College of Alabama, Montgomery, Ala.

TWENTY-ONE MEN'S COLLEGES

Amherst College, Amherst, Mass.
*Armour's Institute of Technology, Chicago, Ill.
Boston College, Chestnut Hill, Mass.
Bowdoin College, Brunswick, Me.
Canisius College, Buffalo, N. Y.
*Case School of Applied Science, Cleveland, Ohio
Centre College, Danville, Ky.
*Citadel Military College, Charleston, S. C.
*Clarkson College of Technology, Potsdam, N. Y.
*Colorado School of Mines, Golden, Colo.
Columbia College, Dubuque, Iowa
Dartmouth College, Hanover, N. H.
Davidson College, Davidson, N. C.
Dayton, University of, Dayton, Ohio
Emory and Henry College, Emory, Va.
Florida, University of, Gainesville, Fla.
Georgetown University, Washington, D. C.
*Georgia School of Technology, Atlanta, Ga.
International Y. M. C. A. College, Springfield, Mass.
Jefferson College, Convent, La.
Johnson C. Smith College, Charlotte, N. C.

ONE HUNDRED FOUR COEDUCATIONAL INSTITUTIONS

Abilene Christian College, Abilene, Tex.
Adrian College, Adrian, Mich.
Akron, Muni. University of, Akron, Ohio
Alabama, University of Tuscaloosa, Ala.
Albany College, Albany, Ore.

Albion College,
Albion, Mich.
Albright College,
Myerstown, Pa.
Alfred University,
Alfred, N. Y.
Allegheny College,
Meadville, Pa.
Alma College,
Alma, Mich.
American University,
Washington, D. C.
Antioch College,
Yellow Springs, Ohio
Arizona, University of,
Tucson, Ariz.
Arkansas, University of,
Fayetteville, Ark.
Asbury College,
Wilmore, Ky.
Ashland College,
Ashland, Ohio
Atlanta University,
Atlanta, Ga.
Atlantic Christian College,
Wilson, N. C.
*Augsburg Seminary,
Minneapolis, Minn.
Aurora College,
Aurora, Ill.
Austin College,
Sherman, Tex.
Baker University,
Baldwin, Kans.
Baldwin-Wallace College,
Berea, Ohio
Bates College,
Lewiston, Me.
Beloit College,
Beloit, Wis.
Benedict College,
Columbia, S. C.
Berea College,
Berea, Ky.
Bethany College,
Lindsborg, Kans.
Bethany College,
Bethany, W. Va.
Bethel College,
Newton, Kans.
Birmingham-Southern College,
Birmingham, Ala.
Boston University,
Boston, Mass.
*Bradley Polytechnic Institute,
Peoria, Ill.
Bridgewater College,
Bridgewater, Va.
Bucknell University,
Lewisburg, Pa.
Butler College,
Indianapolis, Ind.
Capital College,
Columbus, Ohio
Carlton College,
Northfield, Minn.
*Carnegie Institute of Technology,
Pittsburgh, Pa.
Carroll College,
Waukesha, Wis.
Carson and Newman College,
Jefferson City, Tenn.
Carthage College,
Carthage, Ill.
Catholic University of America,
Washington, D. C.
Cedarville College,
Cedarville, Ohio
Centenary College,
Shreveport, La.
Central College,
Fayette, Mo.
Central College,
Pella, Iowa
Central Wesleyan College,
Warrenton, Mo.
Charleston, College of,
Charleston, S. C.
Chattanooga, University of,
Chattanooga, Tenn.
Chicago, University of,
Chicago, Ill.
Cincinnati, University of,
Cincinnati, Ohio
City of New York, College of the,
New York, N. Y.
Clark University,
Atlanta, Ga.
Clark University,
Worcester, Mass.
Coe College,
Cedar Rapids, Iowa
Colby College,
Waterville, Me.
Colorado College,
Colorado Springs, Colo.
Concordia College,
Moorhead, Minn.
Converse College,
Spartanburg, S. C.
Cooper Union,
New York, N. Y.
Cornell College,
Mount Vernon, Iowa
Cornell University,
Ithaca, N. Y.
Creighton University,
Omaha, Nebr.
Dakota Wesleyan University,
Mitchell, South Dakota
Davis and Elkins College,
Elkins, West Virginia
Defiance College,
Defiance, Ohio
Delaware, University of,
Newark, Del.
Denison University,
Granville, Ohio
Denver, University of,
Denver, Colo.
DePauw University,
Greencastle, Ind.
Des Moines University,
Des Moines, Iowa
Detroit, University of,
Detroit, Mich.
Dickinson College,
Carlisle, Pa.
Doane College,
Crete, Nebr.
Drake University,
Des Moines, Iowa
Drexel Institute,
Philadelphia, Pa.
Drury College,
Springfield, Mo.
Dubuque, University of,
Dubuque, Iowa
Earlham College,
Richmond, Ind.
*Emmanuel Missionary College,
Berrien Springs, Mich.
Emory University,
Atlanta, Ga.
Emporia, College of,
Emporia, Kans.
Erskine College,
Due West, S. C.
Eureka College,
Eureka, Ill.
Evansville College,
Evansville, Ind.
Findlay College,
Findlay, Ohio
Fisk University,
Nashville, Tenn.
Geneva College,
Beaver Falls, Pa.
Georgetown College,
Georgetown, Ky.
Indiana Central College,
Indianapolis, Ind.
Indiana University,
Bloomington, Ind.
Iowa Wesleyan College,
Mount Pleasant, Iowa
*Jamestown College,
Jamestown, N. Dak.
John Fletcher College,
University Park, Iowa
John B. Stetson University,
Deland, Fla.
Johns Hopkins University,
Baltimore, Md.
Juniata College,
Huntington, Pa.
Maine, University of,
Orono, Me.
Middlebury College,
Middlebury, Vt.
St. Lawrence University,
Canton, N. Y.
St. Louis University,
St. Louis, Mo.
Walla Walla College,
College Place, Wash.
Whitman College,
Walla, Walla, Wash.

*The institutions whose titles are marked by asterisks are of some other type than the liberal-arts college.

OBJECTIVE EXAMINATIONS IN THE RURAL SCHOOLS OF WYOMING

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AND
HELEN IRVING
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PRIOR to 1922, each county of Wyoming prepared and graded its own examinations for seventh and eighth grades and fixed its own standards for promotion. In 1922, the County Superintendents' Association, feeling that a more uniform system of examinations would assist in raising the standards of the schools of the state, appointed a committee from the members of the Association to prepare a uniform set of examination papers to be used in rural schools throughout the state. The examinations prepared by this committee were approved by the State Department of Education. This scheme proved much more satisfactory than the old plan. For the next four years, uniform examinations were prepared by a committee comprised of county superintendents. There was still a great lack of uniformity in marking in each county, and there probably were as many standards of grading as there were counties in the state.

An attempt was made by the County Superintendents' Committee in 1926 to introduce a more objective method of testing. The plan was to replace the old essay examination by an objective one, to do away with the old percentage basis of grading, and to substitute for it a definite and uniform number-grade system of marks established by a state-wide percentage distribution of the scores made on the new type of examination.

The plan of organization of rural schools in Wyoming must be described if the administration of these tests is to be clearly understood. Spelling and arithmetic are taught by the individual method, which means that each child progresses in these two subjects according to his individual ability. This fact was not seriously considered in the preparation of the first series of tests given in 1926; but it will doubtless affect the future preparation and administration of a state-wide testing program.

Another fact, which did affect the testing program of 1926 and which will determine the content of the tests in the future, is the plan of alternating courses in the rural schools. History, geography, civics, hygiene, and agriculture are organized into three-year cycles for the upper grades. The alternation occurs in the sixth, seventh, and eighth grades in all these subjects except geography where the grades affected are the fifth, sixth, and seventh. This means that, in these subjects, all pupils in the three grades must pass the examinations each year for a period of three years, before being entitled to promotion from the course. Also, the pupils of the three grades must take the same examination each year, and the standards translated from raw scores must be established for each separate grade.

In the construction of the objective examinations, the tests for each subject contained approximately 100 questions covering every phase of the rural course of study for Grades VI, VII, and VIII based on the objectives for the year's work. The items were grouped according to the form of the questions with special directions for giving and answering each. The examinations were made up of recognition and recall tests. The first included multiple-response, true-false, best-answer, and matching exercises; the second comprised recall questions and completion exercises. In addition to these forms, exercises involving arithmetic reasoning and computation and reading comprehension were included. The spelling test consisted of 50 words.

The program of testing extended over a period of two days. The examinations were distributed by each county superintendent in sealed packages for each half-day to be opened at the beginning of each session. Sixty minutes were allowed for each subject except arithmetic, for which ninety minutes were given. The plan was not so much to establish a time limit as to require that all examinations be given at the same time throughout the state. It was necessary, in most cases, to have the tests given by the teachers who were provided with uniform schedules and definite general instructions. The directions for giving each individual test were printed in the test booklet, and for each type of examination the same directions were given in all subjects. Immediately upon the completion of the examination, the papers were sent to the county superintendent's office for scoring.

The teachers were not permitted to score the papers, but the tests were scored by the county superintendent who made a frequency distribution in each of the subjects separately for the sixth, seventh, and eighth grades for the entire county. These tabulations by subject and grade were sent to the committee which then computed a percentage distribution for the entire state in each subject as a preliminary step to establishing standards. For such types of questions as multiple choice, matching, and completion, the scoring was one point for each correct response, while in scoring the true-false, the formula, right minus wrong ($R-W$), was used.

The raw scores on the examinations for the different grades were changed into a percentage scheme of distribution indicating the number-grade in the following manner: 5 percent of the pupils were to receive the mark of 1; 20 percent, the mark of 2; 50 percent, the mark of 3; 20 percent, the mark of 4; and 5 percent, the mark of 5. The pupils falling in the lower 5 percent in the majority of the subjects were considered failures. The grade standards were established by the committee and returned to each county superintendent from which the grades of the pupils were determined by comparison.

The reliability of the tests were determined in reading, arithmetic, civics, history, language, and grammar. The data on reading, arithmetic, civics, and history were taken from the following counties as representative of the State: Carbon, Hot Springs, Laramie, Natrona, and Sheridan; the data on language and grammar from Carbon, Hot Springs, and Albany.

All coefficients of reliability (r) were based on the results of rural eighth-grade pupils only, a rural school being defined as a one-teacher school or one in which there are more than two grades to a teacher. The reliability coefficient of the entire examination was determined from the correlation of chance halves, corrected by means of Brown's formula.[1] In the tabulation of the chance halves the scoring of the true-false type, right minus wrong ($R-W$), was not taken into consideration.

The members of the Committee also sought by means of a questionnaire sent to the State Superintendents of Public Instruction

[1] $r_{nn} = \frac{n\,r}{1+(n-1)\,r}$. *See* Ruch, Giles M. *The Improvement of the Written Examination.* New York, Scott, Foresman and Company, 1925. p. 52.

to procure information regarding the prevalence of eighth-grade final examinations throughout the country. Some of the questions included in the questionnaire with summaries of the replies follow.

1. Are uniform state examinations given in rural schools for promotion to high school from eighth grade?

Replies were received from forty-six states. Twenty-three states[2] promoted to the high school on uniform state examinations. No replies were received from Mississippi and Virginia.

2. If not, on what basis is promotion made?

The remaining 23 states base their promotions on county examinations; examinations regulated locally; or promotion granted by the superintendent, principal, district superintendent, or union superintendent whose decisions are based in part on examinations and in part on the record of daily work.

3. Are examinations given under the direction or supervision of the State Department?

Twenty-two of the twenty-three states having uniform state examinations in rural schools give them under the supervision of the State Department. These examinations are given under the direction of the county superintendent, local school authorities, superintendent, principal, or district superintendent. In Wyoming, the other state, the examinations are prepared by a committee including representatives from among the county superintendents and are given and scored under the supervision of the committee.

4. Is the essay type of examination or some newer type objective form used?

Fifteen states report that objective examinations are used in part.[3]

It was impossible to determine from the answers given in all cases whether by objective examination was meant standardized

[2] Colorado, Delaware, Idaho, Indiana, Iowa, Kansas, Maine, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Dakota, Oklahoma, Oregon, South Dakota, Washington, West Virginia, Wyoming.

[3] Connecticut, Idaho, Illinois, Louisiana, Maine, Minnesota, Montana, New Hampshire, New Jersey, New York, South Carolina, Utah, Vermont, West Virginia, Wisconsin.

tests or the new type of objective examinations. In several states, the samples submitted showed a combination of the objective and essay types of tests. Delaware reported the use of objective examinations, but no samples of tests were received. It would seem that Wyoming, with the possible exception of Delaware, was the first state to put into use entirely objective examinations in rural schools as a basis of promotion from eighth grade to high school.

The County Superintendents' Association has voted unanimously to continue the use of objective examinations as a means of checking the accomplishment preliminary to completion of the eighth grade in the rural schools of Wyoming. The Association proposes to use these examinations as a means of improving the teaching program and to set up more definite standards in the course of study.

THE CORRELATION BETWEEN ACHIEVEMENT AND CAPACITY IN MUSIC

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ALTHOUGH there are a few tests of musical achievement—including the well-known Seashore tests—musical capacity, as well as the musical advancement of pupils, is still judged largely by the personal standards of the music specialist. The aim of this present study was to correlate certain achievement tests which had been devised by the writer with the Seashore phonograph tests for musical capacity.

In September, 1919, fifty-two students applied for admission in the music department of the University of California at Los Angeles. Of these, forty successfully passed the entrance test (FAW-I, to be described) and were enrolled. Only twenty-four of this group survived.

The FAW-I tests were frankly subjective: a series of prognostic tests designed to determine the ability of prospective music supervisors and to record the extent and quality of their musical training, in order to get a clue to the possibilities of their success in the field in which they expected to specialize. The tests were as follows:

1. Each student wrote a list of his piano and voice repertoire. This furnished a clue to his taste and to the quality of his background.
2. Each student was tested in performance in one selection from the voice and one from the piano list, the student making his own selection. This gave an idea of his general technical ability.
3. (Same test as No. 2) The examiner made the selection, and used two pieces of contrasting moods and technical requirement—one requiring agility and control of dynamics, the other showing the use of legato and pedal technique. This was a test in more detailed technical proficiency.
4. Examination in piano sight-reading was given, using material of the difficulty of the *Laurel Song Book* (Tomlin).
5. The examiner played a four-measure melody in moderate tempo of about the difficulty of the elementary-school primer. The student "sang back" (vocal reproduction). This was a test in aural memory.
6. The examiner played the same type of melody and the student wrote the notation, both tonal and rhythmic. This was a test in aural, visual, and motor memory.

The record of the second test (FAW-II) was made at the end of the first week and resulted in a ranking of the observers. This test was an examination in one-part dictation, that is, music-writing from dictation. At the close of the year's work the third test (FAW-III) was given. This was a test of two- and three-part dictation with modulations to near keys and in difficult rhythms.

The Seashore tests were given for the purpose of making, if possible, a preliminary and partial attack on the problem of tests in their function in vocational guidance. It was hoped that they might help to guide the Department of Music in selecting prospective teachers of public-school music and might furnish conclusive evidence early enough to avoid waste. A secondary, but quite important, reason was to show whether or not the personal judgment as to musical capacity and achievement, as applied in the entrance test (FAW-I), as well as in the class testing, had any real significance. The tests were given at the close of the year to help determine whether or not they could be used to supplement and justify a teacher's subjective judgment as shown by the results of a year of class work, and also to ascertain whether the basic course in ear-training in this institution was merely a test and practice in what the students could already do, or the means for developing a new skill. Whether individual spontaneity of musical expression, as demonstrated in the entrance test (FAW-I) and in class work (FAW-II and -III), is an index to musical capacity or merely the result of application and study in pre-adolescent years, has never been quite clear to the writer.

The Seashore tests were scattered over a month, in order to obtain greater reliability; and to determine whether the students could improve in technique or memorize a series or any part of one. The tests in Pitch, Intensity, Time, Consonance, and Memory were given at the close of the school year. They occupied the full class time, fifty-five minutes a day, five days in the week, for five weeks.

Prior to the beginning of the tests the students were told of the requirements of psychological experimentation. They were given adequate preliminary sampling and made thoroughly familiar with the procedure involved in attention to the stimuli and in the recording of their judgments. The students undertook the work with an interest which was maintained throughout the series.

Each student's average for the scores obtained on the five repetitions of each subtest of the Seashore test are listed in Table I. The student's number, given in Column 1 of the table, was determined by the place of his name in the alphabetical list of surnames. The

TABLE I

AVERAGES AND RANKS ON THE FIVE SUBTESTS OF THE SEASHORE TESTS RECEIVED BY THE TWENTY-FOUR STUDENTS

STUDENT'S NUMBER	PITCH		INTENSITY		TIME		CONSONANCE		MEMORY	
	Average	Rank	Average	Rank	Average	Rank	Average	Rank	Average	Rank
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	84.7	21	91.5	12	75.9	23	64.8	20	82.8	22
2	84.1	22	89.2	17	79.2	22	75.4	7	90.4	16
3	87.1	10.5	87.5	22	90.0	6.5	66.2	19	98.8	5
4	86.8	13	88.4	20	82.3	17	72.2	9	100.0	1
5	88.8	6	94.8	3.5	90.9	3	81.0	2	98.1	7
6	85.9	16	91.4	13	83.3	15	70.0	13	78.1	23
7	87.0	12	89.9	16	81.6	18	76.5	5	86.0	20
8	85.2	18	82.6	24	79.9	20	60.8	22.5	94.2	11
9	88.4	7	91.8	10	87.1	11	72.0	10	90.0	18
10	89.5	3	92.9	6	79.6	21	58.6	24	94.5	10
11	85.7	17	96.8	1	90.0	6.5	75.0	8	91.4	14
12	90.9	1	92.6	7.5	92.3	2	79.1	3	99.2	3
13	89.2	4	88.9	18	71.8	24	70.8	11	91.2	15
14	87.1	10.5	95.1	2	86.2	12	69.8	14	97.6	8
15	86.4	15	91.6	11	84.5	14	67.4	17	89.8	19
16	86.7	14	94.4	5	93.4	1	63.5	21	98.8	5
17	89.1	5	86.1	23	81.0	19	77.0	4	94.1	12
18	84.9	19	88.5	19	82.4	16	68.6	16	66.0	24
19	88.0	8	92.6	7.5	88.0	10	60.8	22.5	90.2	17
20	84.8	20	91.3	14	89.7	8	70.5	12	98.8	5
21	89.8	2	94.8	3.5	90.3	5	89.0	1	99.8	2
22	87.5	9	92.3	9	90.6	4	69.2	15	83.6	21
23	83.0	23	90.8	15	86.0	13	66.8	18	92.8	13
24	82.0	24	87.6	21	89.0	9	76.4	6	97.0	9
Average	86.7		90.9		85.6		70.8		91.9	

student's rank within the group is shown for each subtest. Sixty-nine percent of the students made a gain in technique, judged by the comparison of the scores made on the first and last days of testing, in all factors except Consonance. Of those whose scores became smaller between the first and fifth day, the largest number of students (6) went down in Consonance, the smallest numbers

(1) in Time and Intensity, while no student made a smaller score in Pitch on last day than he had on the first. In Table II the rank of each student's composite score on the Seashore test is given in Column 2. In the four successive columns of this table are shown

TABLE II

THE RANKINGS OF EACH STUDENT'S SCORE ON THE COMPOSITE SEASHORE AND FAW TESTS I, II, AND III.

Student's Number	FAW-I	FAW-II	FAW-III	Composite FAW	Composite Seashore
(1)	(2)	(3)	(4)	(5)	(6)
1	21	23	24	24	24
2	11	16.5	19	15.5	21
3	9	6	6	4	11.5
4	16	21	13	18	10
5	1.5	2	2	2	3
6	21	11.5	14	15.5	19
7	7	8	7.5	7	16
8	16	18	23	21	23
9	21	5	3	8	7
10	14	7	9	9.5	13
11	8	4	10	5.5	5.5
12	3	15	4	5.5	2
13	6	9	15	9.5	17
14	23	22	20	22.5	5.5
15	24	14	16	19	18
16	1.5	1	1	1	4
17	18	16.5	21	20	11.5
18	12	19.5	17	17	22
19	4	19.5	11	12	14
20	13	10	7.5	11	9
21	5	3	5	3	1
22	10	13	12	13	8
23	16	11.5	18	14	20
24	19	24	22	22.5	15

each student's ranking in the FAW Tests I, II, and III, as well as the rank of his composite score.

It is interesting to note the successively higher correlations between scores made on the Seashore tests and those of the FAW Tests I, II, and III which are listed in Table III. This might lead one to regard the prognostic value of the Seashore tests as important, although they may test achievement rather than capacity.

It would almost appear that music, in its appeal to students as advanced as these, is really a language, possessing its own significance, and that the academic nature of the technique of the Seashore test militates against success in passing such tests. In the test of Consonance this was especially apparent (see Column 8 of Table I). Consonant and dissonant intervals, when used in the prescribed associations familiar to musicians, are of equal value and are constantly related to each other. The necessity of disassociating these two elements made the test difficult and the records low.

Although, as Dr. Seashore says, it is difficult to find anywhere an adequate definition of consonance and dissonance, any musician can recognize them in their expressive form, and every composer uses these two elements to express a musical idea, whether he is

TABLE III

CORRELATIONS BETWEEN COMPOSITE SCORES ON SEASHORE TESTS AND THE SCORES ON FAW TESTS

	Seashore	FAW-I	FAW-II	FAW-III
(1)	(2)	(3)	(4)	(5)
Seashore	.....	.45 ± .11	.51 ± .10	.73 ± .06
FAW-I	.45 ± .11	.....	.56 ± .09	.64 ± .08
FAW-II	.51 ± .10	.56 ± .09	.....	.80 ± .05
FAW-III	.73 ± .06	.64 ± .08	.80 ± .05	.....

able to define them or not. Indeed, they are the two elements of tonal expression without which significance is impossible.

It is doubtful whether pitch discrimination of intervals less than a half-tone, or dissonance unresolvable by modern mode harmonic progression, is used much by the average musician, aside from the violinist and trombonist. And, there is certainly no necessity for motor control of finer differences than a half-step. Attention is called to case No. 20 (see Table I), the only violinist in the class. Her rank in Pitch was 20, while her rank in Consonance was 12. She is a good violinist but is a singer of more than average ability.

The Seashore tests have been recommended for use in the fifth grade of the elementary school. Music supervisors feel that in a district where the music is expertly managed, the child should be well on his way musically by the time the fifth grade is reached. The writer compiled figures from a number of districts varying in

size, opportunity, and location, which showed that 33 percent of the children were studying piano by the time they reached the fifth grade. When the tests are given as late as the fifth grade it is difficult to distinguish capacity from learned response. The most important thing the Seashore tests attempt to do in the elementary grades is to find the degree of talent the child possesses. The discovery of talent is not so difficult as the prevention of waste in the cases of parents who mistakenly sacrifice themselves to their ambitions for the untalented child. The Seashore tests should be applied in all controversial cases, regardless of age, to reinforce or disestablish personal judgment, and also to check on poor teaching. A group showing a high score under the Seashore tests, and poor results in their grade music, might disclose a weakness in the teaching.

Results of entrance tests in the Department of Music, University of California at Los Angeles, over a period of nine years, bear witness to a lamentable weakness, not so much in musical capacity as in musical apperception. Some of the students have had no actual musical experiences in elementary and secondary schools except through the singing of a limited number of songs by rote. Yet these same students, on entrance to the University, will have at their finger tips a formidable piano repertoire. Still others will have had rich musical experiences in both chorus singing and piano study during their time in the secondary school. In this particular group, the figures show eleven cases much stronger in reading piano music, six cases ranked the same, and seven stronger in vocal sight-reading. Only about 50 percent had the advantages of expert music supervision in the twelve years of the elementary, junior high, and senior high schools. The singing repertoire falls far short of that for the piano, both in quality and quantity. It would seem that the piano material the students have received from their private teachers is not only better in quality and greater in quantity than that for the voice, but the students use it more spontaneously and usefully than they do the training received during the twelve years in public schools. Until recently the same thing might have been said of the reading of vocal music. Grades in piano music-reading in the entrance test were almost invariably better than in vocal sight-reading.

The part which talent played as compared with industry was never clear to the writer. For instance, No. 17 made a rank of 12 and an average of 86 in the Seashore tests, and a rank of 18 in the FAW-I entrance test (see Table II). The general prognostic opinion of her as given by the latter test was that she was as talented as No. 5 whose test in both placed her in the first quartile. All during the first year, however, the former showed her power by spurts, found it next to impossible to concentrate her attention on the work for the whole class hour, was advised to transfer to the general department at the end of the year where she failed in several subjects, and was finally advised by the scholarship committee to try some field other than teaching. She was undoubtedly talented in music, but she had missed the opportunity to develop certain skills which her associates possessed, and she lacked some necessary traits of character which are an aid in overcoming such deficiencies. On the other hand, No. 5 was an excellent musician, strong in talent and training, who made high grades in all of her subjects. She was, however, a weak teacher, had not learned to teach through her subject-matter, and had a struggle all the time to make passing grades in her teaching. But, because she had such a grasp of her subject-matter she was able to concentrate all her attention on the difficult and altogether different problems of teaching this subject to children.

The prospective supervisors of music all agreed that the weakest part of their training had been in the elementary grades—in the lack of musical experience, both in singing and hearing good music. A broader and richer experience of this kind would have helped those who were not particularly strong in teaching to teach more freely through their subject-matter, and it would have helped, by introspection, those like No. 18 in their difficult problem of realizing the difference between teaching school music and adult instruction.

EDITORIALS

THE ULTIMATE INFLUENCE OF STANDARD TESTS

A HUNDRED years from now the educational historian will probably characterize the present era as the one which saw the birth and development of the testing movement. From a half-dozen points of view the introduction of standard tests of intelligence and of school achievement must be regarded as of capital importance, for these devices are already leaving their mark upon school organization and administration, instructional methods, curricular content, textbooks, and even educational ideals.

Thus far, the influence has been most marked upon school organization—including classification of pupils—and methods and curriculum. The purpose of this editorial is to voice a prediction that in the next two or three decades the chief influence will be upon educational aims and ideals.

Why is this prediction made? Do not tests which measure capacity and achievement necessarily place the emphasis upon methods of insuring the mastery of a subject rather than upon the aim or purpose that guides the choice of school activities?

For the initial period of the test era the answer is, Yes. It is true that, up to the present time, tests have acted chiefly to heighten our concern about ways and means of advancing the pupil's achievement as measured by scores on achievement tests. In the investigation of this problem, however, we are beginning to stumble upon some very significant facts—facts which suggest that possibly the emphasis has been wrongly placed.

The evidence which is accumulating suggests, for example, that a lot of factors which we have always regarded as important determinants of pupil achievement probably have, taken separately, relatively little influence upon the child's accumulation of knowledge and skill in most of the school subjects. Several studies to be published in the 1928 yearbook of the National Society for the Study of Education give evidence to this effect. One of these fails

to find any statistically significant difference between the subject-matter achievement of pupils taught by "best" teachers and the achievement of those taught by "poorest" teachers. Another fails to find a significant correlation between the achievement of the pupils and school expenditures. Another investigation, a rather extensive one, fails to find more than a negligible correlation between achievement of unselected ten-year-olds and the total number of days these pupils have attended since entering school. This finding is confirmed by another investigator in another state. Another study indicates that the remedying of physical defects has little or no effect on achievement. Still other investigations, previously reported in educational publications, have shown that achievement is affected to an astonishingly small extent by size of class or by the use of widely different methods of instruction. Thus it seems to make little difference in ultimate achievement whether a pupil is taught phonics or not; whether he is taught reading by the word method, the sentence method, or some other method; whether he is taught spelling as a separate subject or not; or whether 12 percent or 25 percent of the total school time is given to arithmetic.

It is not asserted that these assumed influences count for nothing at all. Probably a sufficiently thorough investigation would show that all of them do count, a little. It might show that all of them together exert in the course of several years a fairly considerable total effect. Even so, the suggestion remains that they are less important than we have commonly thought them to be in their influence upon achievement. The evidence that is accumulating seems to indicate that the mastery of the subject which a pupil of twelve years has attained probably depends more upon his mental level than upon all of these other factors combined, assuming at least a fair amount of educational exposure in schools of the sort commonly found in typical cities of this country. I have little doubt that more searching investigation will confirm this tentative conclusion. If so, what follows?

It would not follow that the testing of the achievement of pupils is futile. The findings reviewed do suggest that the testing of ability is probably even more important than achievement testing, but we are still justified in regarding both as necessary. They are

necessary for school grading and for both educational and vocational guidance.

It perhaps would follow that we ought to reconsider our educational aims. Probably we have been laying too much stress upon the mastery of subject-matter. Probably moderate deviations in achievement, either above or below the "norm," are educationally less significant than we have thought. It has certainly been proved that ability to do certain work, say of the ninth grade, or of the freshman year in college, depends less upon the subject-matter that has been mastered than it does upon general intellectual ability. This is probably true of every grade.

If the present exaggerated emphasis upon subject-matter achievement is lessened, however, what is to take its place? The possibilities are: first, that we shall in time place more emphasis than we do now upon the ethical and social ends of education and care more than we do now about making the school a wholesome place in which to live; second, that we shall stress, to a greater degree than we now do, the child's attitudes and interests as contrasted with his scholastic achievement; and, third, that we shall be more concerned than we now are about the significance of intelligence—both general intelligence and special abilities—for educational and vocational guidance.

L. M. T.

NEWS and COMMUNICATIONS

On action of the Board of Education, the Bureau of Educational Research of the Chicago public schools has been discontinued.

Alfred S. Lewerenz, of the Department of Psychology and Educational Research in the public schools of Los Angeles, has constructed and standardized a battery of nine tests in fundamental abilities of visual art. These tests are suitable for elementary, high-school, and college students.

Dr. Ernest H. Wilkins, formerly of the Romance Language Department of the University of Chicago, was inaugurated President of Oberlin College on October 24. The subject of his inaugural address was "College Teaching."

The Research Division of the National Education Association announces two series of salary tabulations for the year 1926-27. The first of these tabulations is a summary of the fact regarding the salaries paid teachers, principals, and certain other school employees, and the second covers salaries paid administrative and supervisory officers. Each of these is grouped according to the size of the city.

The Bureau of Educational Research and Service at the University of Iowa announces the publication of Forms A and B of a General Information Test in American History. This test has been prepared by Dr. M. H. Degraff, Florida State College for Women; Dr. G. M. Ruch, University of California; and Dr. H. A. Greene, University of Iowa.

Dr. M. V. O'Shea, of the University of Wisconsin, has accepted the invitation of the Educational Commission of Virginia to direct a survey of the educational system of the State. He will be assisted by a staff of specialists in the various departments of education and will make recommendations to the General Assembly for such changes as the findings of the survey indicate necessary.

Frederick D. Cheydleur, associate professor of French at the University of Wisconsin, is the author of a pamphlet entitled *The American Council French Grammar Test (Selection Type): Preliminary Experiment at the University of Wisconsin* (Bulletin, No. 8). This test was prepared for the Modern Language Study and reports the tentative results secured with university students at that institution. Professor Cheydleur found that the test measures up to the criteria set up by such men as Gregory, Odell, Wood, Garrett, and Rugg for standards of achievement tests as regards validity, reliability, objectivity, and simplicity of administration.

Dr. C. F. Malmberg has resigned as Director of the Bureau of Educational Research at Northern State Teachers College, Aberdeen, South Dakota, to become a member of the faculty in the Department of Philosophy at Gettysburg College, Gettysburg, Pennsylvania. He will have charge of the psychology course and a course in mental tests and educational measurements.

The Association of College Presidents of Pennsylvania and the Pennsylvania Department of Public Instruction have agreed to undertake a joint study of secondary- and high-school education in Pennsylvania with special reference to those mutual problems which affect both units of the educational system. Dr. W. S. Learned, assistant secretary of the Carnegie Foundation for the Advancement of Teaching, assisted by Dr. Ben D. Wood, of Columbia University, will direct the study.

At a cost of $1,500,000, a new building, to house a school of classroom practice, will be built at the University of Pennsylvania, according to Dean John H. Minnick, of the School of Education. The school will be independent of the Philadelphia school system and will train students in the School of Education at the University of Pennsylvania. This building should provide ample housing facilities for the University School of Education.

We have lately received the Pennsylvania State Education Association's "Program for Coordinated Research in 1927-28." This strikes us as a splendidly conceived project on the part of the Association. We hope that the teachers of the Keystone State will appreciate it as much as we do and that they will cooperate with each other and with the Research Service of the Association. This program is submitted as Bulletin No. 1, thus implying the establishment of a series. It is published by the Pennsylvania State Teachers' Association at 400 North Third Street, Harrisburg, Pennsylvania.

We were interested to note that one of the projects submitted for the consideration of the school people of Pennsylvania, is Measuring Teaching Efficiency. This is substantially the same kind of project as the Bureau at Ohio State University is announcing in its Bulletin of September 28. It would be a good plan for these organizations to get together.

Educational Research with Suggestions and Sources of Data with Specific Reference to Administration is the title of a pamphlet by Dr. Carter Alexander which has recently been issued by The Bureau of Publications, Teachers College, Columbia University. The aim of this publication is to provide a means whereby graduate students in education may come to know the meaning of educational research, particularly the standards for a dissertation in their field. Several pages are devoted to source materials and bibliographies of individual items which are alphabetically arranged.

Professor Charles D. Bohannan, of the New Mexico State College of Agriculture and Mechanic Arts, has recently completed a survey on *The Present Status of Attempts at Improvement of Instruction in Land-Grant Colleges.*

The study covers eleven phases of the problem among which are: supervision of instruction of new faculty members; number of faculty members taking courses in education; number of semester hours required of candidates for positions; and research on problems of college instruction. The status of each of these phases of the problem is shown by states. In addition to this analysis, there is listed a number of suggested research problems bearing on improvement of college instruction.

Dr. William M. Davidson, superintendent of the Pittsburgh public schools and chairman of the committee on scholastic awards in the annual competition held under the auspices of *The Scholastic*, has announced the plans for this year's awards. New contests, embracing hand metal work, pottery, bookbinding, applied design in textiles, and civic art, will supplement the already established divisions of fine arts, literature, and community service. Three thousand dollars in prizes will be awarded by judges who are to be chosen from men and women of national repute in their respective fields. Additional information regarding this contest may be obtained from *The Scholastic*, Wabash Building, Pittsburgh, Pennsylvania.

Dr. Henry Bowers, Fergus High School, Fergus, Ontario, has recently completed a doctoral dissertation, *Transfer Values of Secondary School Science*, which is published by the University of Toronto Press. The purpose of the study was defined as an effort "to determine to what extent a course in physics or chemistry in Ontario high schools affects ability to score on certain tests." The tests used were forms of the Otis Self-Administering Tests of Mental Ability. The general conclusion is that there is no evidence of transfer or hindrance, from middle- or upper-school physics and chemistry nor from the middle-school subjects of English, algebra, geometry, history, Latin, and French, to such abilities as are measured by the tests that were given.

The Second Annual Conference of Teachers Colleges and Normal School Faculties in the State of New York was held in Syracuse, on September 8 and 9. Three hundred and forty-five faculty members, or 92 percent of the total number who would ordinarily attend such a meeting, were present despite the fact that each paid his own expenses. The purpose of the meeting was to continue the work of defining and outlining courses for the various normal-school curricula. To this end the faculties were divided into committees by subject-matter fields, with a chairman appointed for each group. Dr. Percy I. Bugbee, principal of the State Normal School at Oneonta, and Miss Florence E. Matteson, instructor in history at the same institution, were elected President and Secretary, respectively, for the ensuing year.

An announcement from the University of California calls attention to a national contest in the construction of objective or new-type examinations. Examinations may be offered in any of the following eight groups of high-school subjects: English, social studies, natural sciences, home arts, manual

arts, mathematics, foreign languages, and commercial subjects. By objective, or new-type, examination is meant those employing primarily such devices as the completion, multiple-answer, true-false, matching, and similar types. Examinations submitted will be passed upon by committees of subject-matter specialists in each of the eight fields, selected by the directors of the contest. Each committee will award a first, second, and third prize in each group of subjects, making twenty-four prizes. The first prize is $50; second prize, $30; and third prize, $20. This contest is under the direction of Dr. G. M. Ruch and Dr. George A. Rice.

During the last session of Congress $117,000 was appropriated for a survey of land-grant colleges which is to be conducted by the United States Bureau of Education. The survey will be carried on under the immediate direction of the Chief of the Division of Higher Education of the Bureau who will be assisted by a special Advisory Committee. The nine members of this Committee include: the Secretary of the Interior; the Secretary of Agriculture; R. A. Pearson, president, University of Maryland; R. S. Wilkinson, president, South Carolina State Agricultural and Mechanical College; Francis G. Blair, Illinois State Superintendent of Public Instruction; L. D. Coffman, president, University of Minnesota; S. W. Stratton, president, Massachusetts Institute of Technology; Charles A. Lory, president, State Agricultural College of Colorado; and Miss Martha Van Rensselaer, director of the New York State College of Home Economics, Cornell University.

A study of the relative educational efficiency of the public schools in first- and in third-class districts in Colorado has just been issued by the Department of Educational Research, of the Colorado State Teachers College, Greeley, Colorado. This investigation, in which H. H. Hadley and F. L. Whitney collaborated, is a part of a larger study undertaken by the Rural Research Committee of the Colorado Education Association. Ten representative counties with a total average daily attendance of 49,566 pupils, or approximately one-fourth of all the pupils in all the schools of the State, were included in this study. All districts of Colorado having an enrollment of more than one thousand are classified first-class districts, while those having less than three hundred and fifty are third-class districts. From this comparison of the educational efficiency in the first- and third-class districts, eight tentative generalizations are drawn. Among these are: (1) The average intelligence quotients of pupils in the larger schools are above normal while pupils in the smaller schools are below normal. (2) No marked difference in mean mental age of total pupil population for the two types of school was found. (3) Pupils are younger for their grade in first-class than in third-class district. (4) The larger schools develop the pupil in relation to his capacity more efficiently than the smaller schools. The other generalizations also tend to support the superiority of the schools in the first-class districts.

FOOTBALL PLAYERS VERSUS NON-FOOTBALL PLAYERS

Do football players neglect their academic work on account of their athletic activities? Table I gives evidence on this question with reference to three groups of students who were regularly enrolled in the Fresno State Teachers College during the first semester of 1926-27. As shown by Section A, the data are upon a group of twenty-nine football players and upon two other groups of equal size selected with the same qualifications as the football players and having received the same number of notices of unsatisfactory work for the first six-weeks period. Section B shows the results of the work of the semester as evidence on the permanent record cards of the Recorder.

TABLE I

(1)	Football (2)	Non-Football (3)	Non-Football (4)
	Section A		
Aptitude Test:			
Number at B level	2	0	1
Number at C level	12	14	12
Number at D level	3	5	4
Number at E level	2	1	2
Number not taking the test	10	9	10
Number unsatisfactory marks first six weeks	14	14	14
	Section B		
Average percentile rank in Aptitude Test	41.0	43.1	43.2
Average number of units undertaken	15.7	15.8	15.6
Average number of units completed	12.5	12.3	12.1
Average number honor points earned	14.5	14.4	14.1
Number unsatisfactory marks second six weeks	25.0	25.0	12.0
Number who made less than 10 units	8	8	8
Number who made less than 10 honor points	8	12	11
Number of units dropped during semester	23	50	33
Number of units added during semester	8	6	7

CONCLUSIONS—

1. During the period of intensive training and play the football men did as well as one group in keeping up their scholarship but less well than the other group.

2. The football men did as well as either of the other groups in final records for the semester. A slight advantage is on their side. It is not enough to be significant as a difference, but does seem to justify the opinion that their school work did not suffer from their football activities on the whole.

3. The football men do not drop subjects more than others. It does not appear that they find this more necessary than do others.

4. Football men do as well as others in their academic work when judged in accordance with their aptitude and their semester records.

JOHN W. GROVES

Fresno State Teachers College, Fresno, California

REVIEWS

LaRue, Daniel Wolford. *Mental Hygiene.* New York, Macmillan Company, 1927. x + 443 pp.

The best feature of this book is its numerous questions and exercises for the student to work out himself. A good course in mental hygiene could, in fact, be built around these questions without much use of the text.

In general, the book attempts to cover too much ground. The first part presents a general view of the forces governing personality, and the second part branches off into a discussion of the inheritance of traits. The third section deals with the mental hygiene of adult life, while the last section comes back to a consideration of the needs of children and adolescence. Any one of these divisions could well be a book in itself. The effect of trying to cover them all in one volume has led to a presupposing of background such as would probably not be possessed by the average individual for whom the book is intended. With assistance in interpretation from the instructor the book could be used as a text in college classes. The chapters dealing with the psychoses and neuroses are particularly abbreviated and difficult to understand. The chapters in the third section on the mental hygiene of the adult are the best, and most immediately practical, in the book.

Ohio State University L. C. Pressey

Waples, Douglas. *Problems in Classroom Method.* Chicago, Macmillan Company, 1927. xxii + 609 pp.

Recently the senior partner of a midwest business concern retired. Of his successor he said, "I write my recommendation across his back in letters of gold."

Acknowledging the superlative, the reviewer as heartily commends *Problems in Classroom Method* to the favorable consideration of critical educational practitioners. We must admit a bias, however: we usually experience a favorable reaction to anything new which strikes specifically at the heart of a seemingly impenetrable problem. Waples does this very thing in his new offering, hence, the opening sentiment.

Before going any further, let us mention what Waples speaks of as "the fundamental weaknesses of the book." These are: (1) the inadequate solutions proposed for many of the case problems; (2) the superficial criticisms of such solutions; and (3) the complexity of the procedures for problem solution.

We are inclined to agree with the last of these. "Too complicated; too involved for practical use," said one of our colleagues who had had no oppor-

tunity to examine the book carefully. Yet we feel that after a few attempts the thoughtful teacher will succeed measurably in the use of this new tool.

In spite of these weaknesses, whose importance is modified as one considers the larger purposes of the author, the book represents the most constructive attempt to do something about the specific problems of the classroom that has come to our attention. It is high time that somebody is seriously applying himself to this task. Ample evidence has accumulated, through the researches of Buellesfield, Colvin, Hughes, Worcester, Johnson, Bradford, and others, that teachers react to the *immediacy* of problems. They want help right here and now, and rightly so, since the issues of the classroom are inescapable. Thus, only the most practical treatment imaginable will suffice.

Waples has got at this problem of practicality in two ways. First, he has drawn his case problems fresh from the classroom. Second, he has incorporated in his remedial suggestions those practices which the contributing teachers themselves have tested and found successful. Naturally this reduces theory to a minimum and lends confidence to the person who would use the book.

This manual—for it is that—is both diagnostic and prescriptive; diagnostic because it helps the troubled teacher to locate typical difficulties when he is not quite sure as to just what is wrong, and prescriptive because it contains a most ingenious system of cross references whereby the teacher is led, after the analysis of a difficulty, straight to the remedies in question. These features indeed create a favorable impression.

Here, then, we have "an attempt to provide a standardized procedure by which different kinds of help may be obtained from several sources by the teacher himself." Only further application to the actual problems of teaching will dictate what refinements should be added.

University of Nebraska HARLAN C. KOCH

CULTER, HORACE M. *Elementary School Methods.* Philadelphia, J. B. Lippincott Company, 1927. xi + 382 pp.

This book is written for the "teacher with little or no experience," and "the young person who teaches in the small town or the open country." The author has endeavored to clothe the abstract truths of psychology and pedagogy in such simple language that high-school Seniors may understand them. The illustrations for the most part are concrete and well selected. It is evidently the author's plan to have his book function among teachers, or prospective teachers, who have a limited amount of training as well as "little or no experience."

The materials in the book are, on the whole, well selected. Those in Part I on the "Aims of Education and the Teaching Process," "Motives," "Problems of the Teaching Process," "Induction," "Deduction," and "Planning the Lesson" are rich with good suggestions and original illustrations. The materials of Part II, however, are not up to the standard of

Part I. Directness and sureness of approach are lacking in some instances. In others, the author's suggestions fall short in completeness and polish. The result is a feeling of uncertainty which tends to carry over even to the well-grounded and well-worked out suggestions.

The book on the whole is a welcome contribution in the field of elementary education. It sets forth modern views and interpretations of the fundamentals necessary to successful teaching. The suggestions on method use results of the latest scientific research. Where differences of opinion appear among the authorities it takes a conservative course. It has a wealth of valuable material, and, in spite of some apparent shortcomings, it should contribute much to its particular field.

E. L. RITTER

Iowa State Teachers College

GOOD, CARTER V. *The Supplementary Reading Assignment.* Baltimore, Warwick and York, 1927. ix + 227 pp.

This volume presents interesting and important data on a problem to which little attention has been paid. The common practice of assigning numerous supplementary readings in both high schools and colleges has become very widespread. There has been little proof, however, that such a practice is any better than the careful intensive study of a single text. In *The Supplementary Reading Assignment* Professor Good reports a series of experiments under a grant of the Commonwealth Fund which throws light on this question. The author asks:

> From the standpoint of range and accuracy of information, application of material read to the solution of problem situations, the reproduction of thought, the retention of ideas, and the sensing of fundamental relationships, which is the better procedure, to read a short selection intensively or to read a larger amount of material extensively?

He finds that the extensive method is generally superior on all counts save one, that is, on ability to reproduce ideas. He also finds that, in general, the single reading of extensive material is superior to the repeated reading of material of a more restricted character.

As a report of a series of experiments of an important character this book has great value to those interested in the scientific investigation of reading and study. While the group method is employed and the conclusions are subject to the same criticism as those of other group studies, the findings are significant.

The author's attempts to make the book of immediate value to the classroom teacher seem, to the reviewer, not to be realized. It is a book for the advanced student and investigator. Its significant contribution is on the technical question of the relative return for time and energy spent on extensive versus intensive reading. This, however, is a sufficient contribution for any book to make.

University of Pittsburgh G. A. YOAKAM

McKown, Harry C. *Extra-Curricular Activities.* New York, Macmillan Company, 1927. xxii + 617 pp.

An important addition to the literature dealing with the social life of the school has been made by Professor McKown, of the University of Pittsburgh, in his book entitled *Extra-Curricular Activities.* The predominating characteristics of this volume are its comprehensiveness and its wealth of concrete material. The first two chapters are theoretical. They are concerned with the objectives of education and of extra-curricular activities, certain general principles of administration, and the psychology of adolescence. Several chapters are devoted to the description of different kinds of organizations including the home room, student council, assembly, clubs, dramatics, musical organizazations, literary societies, secret societies, athletics, honor societies, and the school bank. An unusually elaborate treatment of student publications is presented in six chapters, one of which is concerned with values, two with the school newspaper, and one each with the magazine, yearbook, and handbook. The space of several chapters is given to a number of other phases of school life, such as school spirit and citizenship, manners and courtesy, student participation in the control of study halls, parties, school trips and excursions, commencement, and miscellaneous activities, including the motion pictures, the Big Sister movement, and contests.

In a single long chapter several pages are given concerning such extra-school activities as Girl Reserves, Hi Y, Junior Red Cross, Boy Scouts, Girl Scouts, and Camp Fire Girls. Three chapters are devoted to the administrative problems that center around the financing of activities and encouraging and limiting participation. The conclusion is concerned with dangers in administration and research in the field.

Although the form of organization and method of treatment in the thirty-one chapters is by no means the same, the discussion of the different kinds of student organizations and informal activities appears to follow an outline of important main topics. The greater part of many of the chapters is devoted to this kind of discussion, in which the main purpose of the author is to provide an adequate amount of sound information.

Brief summaries and extensive lists of references are found at the ends of chapters. Twenty-one figures and six tables help to clarify the presentation. The author's style of writing is terse but simple and clear; and much ground is covered rapidly and effectively.

The book is primarily a manual of practice that supplies an extraordinarily large amount of material that will be useful to principals and teachers in service who are in charge of extra-curricular activities. It can also be used very effectively as a textbook in courses on extra-curricular activities for teachers in training.

Paul W. Terry

University of North Carolina

GATES, ARTHUR I. *The Improvement of Reading: A Program of Diagnostic and Remedial Methods.* New York, Macmillan Company, 1927. xii + 440 pp.

According to the author's Preface, the purpose of this book is to set forth "a system of measuring achievement, diagnosing difficulties, and conducting instruction." Much of the work centers around a new method of teaching reading which is called the "intrinsic method."

The main part of the volume is divided into three sections. The first section deals with primary reading, the second is concerned with reading in all grades above the second, and the third is devoted to those cases in which extreme reading difficulty exists. The general plan of each of these sections consists in the presentation of tests for different phases of reading ability, the discussion of deficiencies found through the use of the tests, and suggestions with respect to remedial measures. The tests employed are of many different types and are well developed. Some of these represent a new approach to the problems in reading, as seen in those tests in perception involving geometrical form. This type of problem has usually been investigated by the more detailed method of the tachistoscope.

One of the best discussions in the book is found in chapters VI and VII. The problem treated has to do with the methods involved in the recognition of words by children. This treatment would have been stronger, however, if the author had adopted, at least in part, the nomenclature of the German investigators who have studied some phases of this problem in great detail.

The greatest single contribution of the book is in the proposal of a new method for the teaching of deaf mutes. This discussion will be of interest to every teacher of deaf children.

C. T. GRAY

University of Texas

PRINGLE, RALPH W. *Methods with Adolescents.* Boston, D. C. Heath and Company, 1927. xvii + 437 pp.

In our judgment, this book shows a much greater command of the experimental data and recent research in education than the author's former one, *Adolescence and High School Problems.* While there may be a slight tendency to go back to the days when the adolescent was described in vivid rather than accurate terms, one feels, on the whole, that the treatment is scholarly.

The attempt to deal with method in terms of adolescent psychology is, as far as we know, the first attempt of its kind in so large a field. Undoubtedly one of the great weaknesses of educational psychology has been its inability to function in specific instances, for example, in the teaching of algebra, geometry, or Latin. Dr. Pringle has attempted here to meet this problem; and, while there is assuredly yet much to be desired in his treatment of it, the book is a splendid contribution in the right direction. Perhaps several years must yet pass before we can actually make educational psychology the tool it is destined to become.

It is of interest to note that the book purports to be a book of "special methods," not a "book of devices." In this respect the author has carried out his intent. It seems to be a rather popular slogan with writers on methods to get away from devices and insist on general methods. One wonders whether this is done because devices are not needed, or because writers on methods are not sure enough of their devices? In recent years, the writer has heard several teachers say that what they needed was devices, in other words, methods of applying general theory. Perhaps, however, this would be impossible in so small a book as Dr. Pringle's, even though it does contain 437 pages; or perhaps books of that kind must be written by specialists in subject-matter.

L. A. PECHSTEIN

University of Cincinnati

FERRISS, EMERY N. *Secondary Education in Country and Village.* New York, D. Appleton and Company, 1927. xx + 401 pp.

The author accepts as his thesis the general principle that, in a democracy, every normal youth should find educational opportunities in the secondary school which are suited to his capacities, appeal to his interests, and contribute to his life purposes. The principle is accepted in theory, but is not fully realized in practice even in the largest communities. More particularly is it not realized in the secondary school of the small community. Unfortunately, current educational opinion for the most part doubts that it can be realized. The author maintains that the principle is applicable to the small community. In support of his thesis he presents the guiding principles of secondary education in a democracy from both the psychological and the sociological points of view, indicates their application and adaptation to the work of the small secondary school, and considers their bearing upon many of the major administrative questions confronting the small community.

The theme is successfully developed. Throughout, secondary education is adapted to the needs of the small school as the social institution meeting the educational demands of the time. The curricular offerings, the internal organizations, the extra-curricular activities, the administrative and supervisory problems, the relation to higher institutions, and the community activities of secondary education are carefully presented and applied to the rural and village high school.

Democracy in secondary education demands recognition of the principle that the high school is a social institution that must serve *all* normal children of the adolescent age. The varied curricula, the exploratory courses, the vocational offerings, the pupil guidance, the extra-curricular and social activities, and the higher educational level included within the scope of the junior and senior high schools and the junior college must be included in the educational program of the small community. The administrative difficulties involved are recognized and are to be overcome through consolidating districts, improving highways, and increasing the pupil population of each secondary unit.

Statistical tables, diagrams, and practical illustrations are wisely introduced to support the discussions and the conclusions. The author has made a distinct contribution to both rural and secondary education. The volume should be welcomed by those interested in both fields.

JOHN M. FOOTE

Louisiana State Department of Education

KOOS, LEONARD V. *The American Secondary School.* Boston, Ginn and Company, 1927. xii + 755 pp.

This is beyond doubt the most comprehensive treatise yet published in the field of secondary education. Like many of its predecessors on the principles of secondary education, the book is a fundamental treatment of the whole secondary field. It differs from its predecessors in several vital respects.

First, it includes the "extended secondary school," comprising the junior high-school movement in the 6-3-3 plan and the junior-college movement in the more recent trend toward the 6-4-4 plan. Second, the present refinements of educational research and of scientific methods in educational progress have been employed by the author as his invariable factual basis in the treatment of each chapter, and the volume accordingly gives not only the author's personal judgment which so largely characterizes former similar volumes but also the composite judgment of students in the research field. Third, the book extends former treatises to comprise modern movements of progress in secondary education, such as present-day curriculum reconstruction and recent progress in rural secondary education. Finally, the book uses profusely the modern method of clarifying a text by graphs and charts which alone clearly represent years of painstaking search and investigation.

The constantly changing concepts of secondary education formulated during recent years by individual leaders are summarized into a clear and definite "composite portrait of the aims and functions of secondary education." These aims and functions are likely to become as standard, when the *American Secondary School* is more generally known and used, as the seven main objectives; in fact, the aims and functions are an interpretation of these objectives in terms of the present-day extended secondary school.

This book both portrays the reconstruction of the four-year high school upon the prevailing practice of six years of secondary education and clearly reveals the trend toward an eight-year secondary period. Thus it pioneers, together with the author's companion book on the junior high school and on the junior college, along the trail which is likely to lead ultimately to a six-year elementary school, a four-year junior high school, and a four-year senior high school. For this reason alone, public-school administrators and leaders and students in the secondary field will find this volume a help in solving present-day problems according to the light of assured future developments.

JAMES M. GLASS

Rollins College

ENGELHARDT, FRED, AND VON BORGERSRODE, FRED. *Accounting Procedure for School Systems.* New York, Teachers College, Columbia University, 1927. xii + 130 pp. (School Administration Series)

One of the most urgent needs in the business administration of the schools today is an efficient accounting procedure. Although much progress has been made during recent years toward securing a desirable procedure, conditions are far from being satisfactory. Necessity—that mother of invention—has compelled industrial concerns to install efficient financial-accounting procedures.

The schools, however, have not been under the same urge as have industrial concerns. They are not organized for profits, nor have they been required by the public to show the cost of providing this and that service. In the absence of such requirement upon the part of the public, school officials have not realized the importance of a good accounting procedure. Even the successful business man on the board of education will often tolerate in his school system a financial-accounting procedure which he would consider archaic for his business concern. To say that school financial accounting is in a chaotic condition is to state the situation mildly.

To correct the conditions above described, two things are needed, namely, better financial-accounting forms and more competent clerks to keep the records. The book now reviewed will do much to meet these needs, particularly the first. It presents in outline form a financial-accounting procedure which most school systems will find adequate. It contains samples of thirty-seven accounting forms and explains briefly the purpose of each form. The book is a distinct contribution in a field which has been too long neglected.

The fact that the procedure which the book presents is much more complex than the typical school system uses today, and will therefore impress the typical school clerk as unwieldy, should not be held against the book. The authors are not shooting at the head of the typical clerk—they are shooting at where his head ought to be. To be sure, the procedure will be slightly intricate for most clerks, but so is the solution of a problem in geometry or the translation of a Latin sentence to one who is making his first acquaintance with such matters.

WARD G. REEDER

Ohio State University

SPAULDING, FRANCIS T. *The Small Junior High School.* Cambridge, Massachusetts, Harvard University Press, 1927. xvi + 226 pp.

This volume is a distinct addition to literature in the field of the junior high school. It has united in a unique way the findings of a study of a limited number of schools of the type which the author wishes to discuss and a consideration of the fundamental principles underlying the movement itself. A distinct effort has been made to keep separate the conclusions which are applicable to any small junior high school and those which apply only to the school studied. Personal visitation, carefully checked records, and a comprehensive study of literature in the field have been combined to make the material presented particularly worth while.

Since the junior high-school type of organization has been definitely adopted by a large number of city schools, there is a strong tendency for small communities to attempt similar organizations without a complete understanding of the limitations which the size of their student body necessarily imposes. The volume should be especially helpful to young school administrators working in school communities which are tempted to establish this type of organization without a full understanding of the problem involved. The point of view set forth in the following quotation is amply illustrated:

> However completely the small school may avail itself of the administrative procedures which we have suggested, its attainment of the fundamental objectives of the junior high school reorganization must depend primarily upon the direction and quality of its instruction. The latter is a necessary resultant of the skill of teachers whom it is able to employ, the vision and effectiveness of its supervision, and the adequacy of its equipment.

Many administrators have thought they had a junior high school when they had segregated certain grades in a separate building or had introduced departmental teaching or established one or another of the externals which are associated with this type of organization. Too often the fundamental objectives of such an organization, namely, a reorganized subject-matter, a modified teaching procedure, the provision of a different social experience, and the establishment of a system of guidance have been overlooked. Schools have continued to use the subject-matter and teaching method of the elementary schools or have changed abruptly to subject-matter and methods of the high school instead of providing a gradual transition. These facts have been pointed out, with something of their fundamental causes, as found in the schools under consideration.

The author has been particularly successful in pointing out the limitations of curricula, especially electives, and of social experience which are inherent in the small school due to limited enrollment and number of teachers as contrasted with deficiencies due to lack of specific training of teachers and administrators and lack of supervision. He has shown that to keep the size of class large enough to maintain unit costs at a legitimate level either the number of electives must be curtailed or the grouping of children of different grades carried to a place disadvantageous to the teaching process. A careful study of this book by administrators considering the establishment of junior high schools in small communities will assist them greatly in reaching a wise decision.

The material is well organized, adequately set out with side-heads, and the conclusions presented in a clear and concise style.

E. J. Ashbaugh

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Strayer, George D., and Engelhardt, N. L. *School Building Problems.* New York, Teachers College, Columbia University, 1927. xiv + 697 pp.

In the Preface the authors indicate that this volume is a further extension of the plan incorporated in the *Problems in Educational Administration* which

they with their colleagues issued a year ago. It differs in one respect from this earlier volume, for the problems in it covered the whole field of school administration whereas the present volume is confined to an intensive analysis of the problems in a particular field. They further indicate their plan to prepare a series of problem books each dealing with a special phase of administration similar to the one now under discussion.

In this volume one hundred nine school-building problems, classified under such headings as "Population Studies," "School Building Programs," "Construction of School Buildings," "Equipment Planning," and "Financing School Building Programs" have been gathered from communities ranging in size from villages to large cities throughout the United States. Each problem is first formulated, then it is followed by certain pertinent facts relating to it. The assignment which consists of a series of questions relating to the problem is also followed by a carefully prepared bibliography.

Since these are actual concrete problems which have confronted, and will in all likelihood continue to confront, school administrators, this volume should furnish valuable material for classes in school administration. Although no solution to the problem is suggested the volume has a practical value to the administrator in the field, since the problems outlined therein are similar to those which he may face at any time; and, furthermore, the questions raised in connection with these problems often suggest the factors to be considered in their solution.

T. C. Holy

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PUBLICATIONS RECEIVED, SEPTEMBER 15 TO OCTOBER 15

BOOKS FOR EDUCATIONAL EXECUTIVES

Davis, G. P. *What shall the public schools do for the feeble-minded?* Cambridge, Mass., Harvard Univ. Press, 1927. 225 pp. $3.50.

Duggan, S. P. *A student's textbook in the history of education.* Rev. ed. New York, Appleton, 1927. 414 pp. $1.90.

Engelhardt, Fred. *Business administration, Ortonville public schools, Ortonville, Minnesota.* Minneapolis, Minn., Univ. of Minnesota, 1927. 50 pp. (Educational monograph, no. 15) $.50.

Engelhardt, N. L., and Engelhardt, Fred. *Public-school business administration.* New York, Teachers College, Columbia Univ., 1927. 1068 pp. $7.50.

Japan. Department of Education. *A general survey of education in Japan.* Tokyo, The Author, 1926. 88 pp.

Mays, A. B. *The problem of industrial education.* New York, Century, 1927. 416 pp. $2.25.

Odell, C. W. *Are college students a select group?* Urbana, Ill., Univ. of Illinois, 1927. 45 pp. (Bureau of educational research. Bulletin no. 34) $.25.

BOOKS FOR PSYCHOLOGISTS

Bowers, Henry. *Transfer values of secondary-school science.* Toronto, Univ. of Toronto Press, 1927. 96 pp. $2.00.

Burrow, Trigant. *The social basis of consciousness.* New York, Harcourt, Brace, 1927. 256 pp. $4.00.

Conklin, E. S. *Principles of abnormal psychology.* New York, Holt, 1927. 457 pp. $4.50.

Griffith, C. R. *Psychology of coaching.* New York, Scribner, 1926. 213 pp. $2.00.

Lehman, H. C., and Witty, P. A. *The psychology of play activities.* New York, Barnes, 1927. 242 pp. $2.00.

Rice, Louise. *Character reading from handwriting.* New York, Stokes, 1927. 373 pp. $5.00.

Roback, A. A. *The psychology of character, with a survey of temperament.* New York, Harcourt, Brace, 1927. 595 pp. $5.50.

Wallin, J. E. W. *Clinical and abnormal psychology.* Boston, Houghton-Mifflin, 1927. 649 pp. $3.00.

BOOKS FOR TEACHERS AND SUPERVISORS

Bilhuber, Gertrude, and Post, Idabelle. *Outlines in health education for women.* New York, Barnes, 1927. 192 pp. $2.00.

Clark, Imogen. *Suppose we do something else.* New York, Crowell, 1927. 268 pp. $2.00.

Dawson, Edgar, and others. *Teaching the social studies.* New York, Macmillan, 1927. 405 pp. $2.00.

Farnsworth, C. H. *The why and how of music study for parents and students.* Boston, Oliver Ditson, 1927. 77 pp. $.60.

Frost, Helen, *Oriental and character dances.* New York, Barnes, 1927. 118 pp. $3.00.

Gardner, E. E., and Ramsey, Eloise. *A handbook of children's literature.* Chicago, Scott, Foresman, 1927. 354 pp. $2.00.

Lowman, G. S. *Practical football and how to teach it.* New York, Barnes, 1927. 280 pp. $4.00.

Lutes, O. S. *An evaluation of three techniques for improving ability to solve arithmetic problems; a study in the psychology of problem solving.* Iowa City, Ia., Univ. of Iowa, 1926. 41 pp. (Monographs in education. First series, no. 6) $.50.

Lutes, O. S., and Samuelson, Agnes. *A method for rating the drill provisions in arithmetic textbooks, with ratings for six arithmetic series.* Iowa City, Ia., Univ. of Iowa, 1926. 148 pp. (Monographs in education. First series, no. 3) $1.50.

Malcolm, D. J. *The letters of a country school superintendent to his daughter; a book of rural school management.* Chicago, Sanborn, 1927. 165 pp. $1.44.

Sangren, P. V. *The measurement of achievement in silent reading.* Kalamazoo, Mich., Western State Teachers College, 1927. 88 pp. Cloth, $1.00. Paper, $.75.

Thies, L. J. *The time factor in arithmetic texts.* Iowa City, Ia., Univ. of Iowa, 1926. 38 pp. (Monographs in education. First series, no. 2) $.50.

Wallis, B. C. *The technique of examining children; a quest for capacity.* New York, Macmillan, 1927. 136 pp. $1.25.

Wiley, J. A. *Silent reading and study objectives and principles.* Cedar Falls, Ia., Iowa State Teachers College, 1927. 308 pp. $2.00.

BOOKS FOR HIGH-SCHOOL STUDENTS

Beck, J. M. *The constitution of the United States.* New York, Doran, 1924. 362 pp. $2.50.

Browning, Robert. *The ring and the book.* New York, Crowell, 1927. 516 pp. $2.50.

Davis, B. M. *The human body and its care.* Chicago, Rand McNally, 1927. 284 pp. $2.00.

Farmer, L. H. *The book of famous queens.* New York, Crowell, 1927. 399 pp. $2.50.

Gilmore, M. J. *The secret of Scared Acres.* Boston, Lothrop, Lee, 1927. 330 pp. $1.50.

Heydrick, B. A. *How to study literature; a guide to the intensive study of literary masterpieces.* Third ed., rev. and enl. New York, Noble & Noble, 1927. 158 pp. $.85.

Holmberg, Fredrik, and Giard, C. F. *Elementary theory of music.* Third ed., enl. and rev. Oklahoma City, Harlow Pub. Co., 1926. 222 pp. $1.58.

Hosic, J. F., and Hatfield, W. W. *Introductory studies in literature.* New York, Century, 1927. 556 pp. $1.90.

Irwin, F. C., and others. *Beginning chemistry and its uses.* Evanston, Ill., Row, Peterson, 1927. 607 pp. $1.60.

Labiche, Eugène. *Le voyage de Monsieur Perrichon; comédie en quatre actes.* Ed. by Moritz Levi. Chicago, Sanborn, 1927. 211 pp. $1.12.

Mathews, J. M. Essentials of American government. Boston, Ginn, 1927. 419 pp. $1.60.

Mérimée, Prosper. *Colomba.* Ed. by Edward Manley. Chicago, Sanborn, 1927. 304 pp. $1.12.

Miller, Agnes. *Two girls and two treasures.* Boston, Lothrop, Lee, 1927. 317 pp. $1.50.

Morgan, J. J. B., and Gilliland, A. R. *An introduction to psychology.* New York, Macmillan, 1927. 319 pp. $1.60.

Nutting, H. C. *Ad Alpes; a tale of Roman life.* Chicago, Scott, Foresman, 1927. 298 pp. $1.20.

Robinson, J. H., and Beard, C. A. *History of Europe; our own times.* Rev. ed. Boston, Ginn, 1927. 678 pp. $1.96.

Shurter, E. D., and Tower, D. M. *Oral English and public speaking.* Rev. and enl. Evanston, Ill., Row, Peterson, 1927. 289 pp. $1.20.

Torres, Arturo. *Essentials of Spanish.* Garden City, N. Y., Doubleday, Page, 1927. 414 pp. $1.50.

Werremeyer, D. W., and Lake, C. H. *Minimum essentials of mathematics, ninth year.* New York, Silver, Burdett, 1927. 244 pp. $1.16.

Willard, R. C., and Robinson, E. K. *Map exercises, syllabus, and notebook in world history.* Boston, Ginn, 1927. 64 pp. $.56.

BOOKS FOR JUNIOR HIGH-SCHOOL STUDENTS

Barrett, E. C. *Betty Jane of the cheer shop.* Boston, Lothrop, Lee, 1927. 302 pp. $1.50.

Fuess, C. M. *Peter had courage; a story for boys.* Boston, Lothrop, Lee, 1927. 327 pp. $1.75.

Geibel, M. T. *Norma's friends; a story of talents.* Boston, Lothrop, Lee, 1927. 326 pp. $1.50.

Hallock, G. T., and Wood, T. D. *Grain through the ages.* Chicago, Quaker Oats Co., 1927. 96 pp.

Hayes, H. W. *The newspaper game; how it was successfully played by two enterprising boys.* Boston, Lothrop, Lee, 1927. 348 pp. $1.50.

Hughes, R. O. *The making of our United States.* Boston, Allyn & Bacon, 1927. 667 pp. $2.00.

Logasa, Hannah. comp. *Historical fiction suitable for junior and senior high schools.* Philadelphia, McKinley Pub. Co., 1927. 85 pp. (Publications of the National council for the social studies, no. 1) $1.00.

Murphy, Marguerite. *Patricia's problem.* Boston, Lothrop, Lee, 1927. 293 pp. $1.50.

Robbins, Orison. *A boy of the old French West.* Boston, Lothrop, Lee, 1927. 284 pp. $1.75.

Rogers, W. G. *Fluent French for beginners.* Chicago, Sanborn, 1927. 186 pp. $1.12.
Scheck, C. C., and Orton, M. A. *Directed history study.* Yonkers-on-Hudson, N. Y., World Bk. Co., 1927. Book 2. 119 pp. Book 3. 119 pp. $.56 each.
Tryon, R. M., and Lingley, C. R. *The American people and nation.* Boston, Ginn, 1927. 692 pp. $1.72.
Winburn, H. L. *The lead-hunters of the Ozarks.* Boston, Lothrop, Lee, 1927. 374 pp. $1.75.

BOOKS FOR ELEMENTARY-SCHOOL STUDENTS

Bruce, Marjory. ed. *A treasury of tales for little folks.* New York, Crowell, 1927. 284 pp. $3.00.
Craine, E. J., and Burton, A. N. *Happy days out west for Littlebits.* Chicago, Rand McNally, 1927. 129 pp. $1.00.
Davis, E. C. *Polly Wiggles and some others.* Boston, Lothrop, Lee, 1927. 317 pp. $1.50.
Fox, F. M. *Angeline goes traveling.* Chicago, Rand McNally, 1927. 256 pp. $1.25.
Gage, Lucy. *Out and playing; a first reader.* New York, Mentzer Bush, 1927. 128 pp. $.64.
Greene, H. A., and others. *Economy remedial exercise cards in whole numbers.* Chicago, Scott, Foresman, 1927. Unit set. $1.20.
Hall, N. H. *Beginner's book in writing and spelling.* Chicago, Hall & McCreary, 1927. 48 pp. $.20.
Kilner, C. B. *La-la man in music land.* Boston, Lothrop, Lee, 1927. 32 pp. $1.50.
Kinscella, H. G. *Kinscella music appreciation readers.* Lincoln, Nebr., University Pub. Co., 1927. Book 4. 310 pp. $.88.
Knowlton, P. A. *Introduction to world geography.* New York, Macmillan, 1927. 298 pp. $1.32.
Kyle, Margaret. *Little sister.* New York, Harper, 1926. Unp. $2.50.
Lawton, Alice. *Goose Tone tales.* New York, Crowell, 1927. 234 pp. $2.00.
Lucas, E. V. *A cat book.* New York, Harper, 1927. Unp. $1.50.
Peary, J. B. *La snow baby.* Trans. into French by M. A. Peary. New York, Stokes, 1927. 81 pp. $1.50.
Rolfe, M. A. *Our national parks.* Chicago, Sanborn, 1927. Book 1. 320 pp. $1.00.
Stone, K. P. *The four-year-old's story book.* Boston, Lothrop, Lee, 1927. 159 pp. $1.50.
Trafton, G. H. *Nature study and science for intermediate grades.* New York, Macmillan, 1927. 367 pp. $1.20.
Youmans, Eleanor. *Skitter Cat and Major.* Indianapolis, Bobbs-Merrill, 1927. 153 pp. $1.50.

MISCELLANY

Baltzell, W. J. *Noted names in music.* Boston, Oliver Ditson, 1927. 108 pp. $.60.
Crabb, George. *English synonyms explained in alphabetical order.* New ed. New York, Crowell, 1927. 801 pp. $3.00.
Gehrkens, K. W. *Handbook of musical terms.* Boston, Oliver Ditson, 1927. 103 pp. $.60.

PUBLICATIONS RECEIVED, OCTOBER 15 TO NOVEMBER 15

BOOKS FOR EDUCATIONAL EXECUTIVES

Archdeacon, J. P. *The week-day religious school; a dissertation.* Washington, Catholic Univ. of America, 1927. 90 pp. $1.25.

Armentrout, W. D. *The conduct of student teaching in state teachers colleges.* Greeley, Colo., Colorado State Teachers College, 1927. 198 pp. (Education series, no. 2) $2.00.

Columbia University. Teachers College. Institute of Educational Research. Division of Field Studies. *Report of the survey of the schools of Beaumont, Texas.* New York, Teachers College, Columbia Univ., 1927. 337 pp. $1.50.

Columbia University. Teachers College. Institute of Educational Research. Division of Field Studies. *Report of the survey of the schools of Lynn, Massachusetts.* New York, Teachers College, Columbia Univ., 1927. 368 pp. $1.50.

Davis, C. O. *Our evolving high-school curriculum.* Yonkers-on-Hudson, N. Y., World Bk. Co., 1927. 301 pp. $2.00.

Elliott, Ruth. *The organization of professional training in physical education in state universities.* New York, Teachers College, Columbia Univ., 1927. 67 pp. (Contributions to education, no. 268) Cloth, $1.50. Paper, $1.25.

Hill, C. M. *A decade of progress in teacher training.* New York, Teachers College, Columbia Univ., 1927. 219 pp. (Contributions to education, no. 233) Cloth, $1.50. Paper, $1.25.

Kelley, T. L. *Interpretation of educational measurements.* Yonkers-on-Hudson, N. Y., World Bk. Co., 1927. 363 pp. $2.20.

Koos, F. H. *State participation in public-school library service.* New York, Teachers College, Columbia Univ., 1927. 246 pp. (Contributions to education, no. 265) Cloth, $1.50. Paper, $1.25.

Landis, B. Y. *Professional codes, a sociological analysis to determine applications to the educational profession.* New York, Teachers College, Columbia Univ., 1927. 108 pp. (Contributions to education, no. 267) Cloth, $1.50. Paper, $1.25.

Morehart, G. C. *The legal status of city school boards.* New York, Teachers College, Columbia Univ., 1927. 96 pp. (Contributions to education, no. 270) Cloth, $1.50. Paper, $1.25.

Myers, A. F. *A teacher-training program for Ohio.* New York, Teachers College, Columbia Univ., 1927. 144 pp. (Contributions to education, no. 266) Cloth, $1.50. Paper, $1.25.

Proctor, W. M. ed. *The junior college; its organization and administration.* Stanford University, Calif., Stanford Univ. Press, 1927. 226 pp. $2.50.

Reynolds, O. E. *The social and economic status of college students.* New York, Teachers College, Columbia Univ., 1927. 57 pp. (Contributions to education, no. 272) Cloth, $1.50. Paper, $1.25.

BOOKS FOR PSYCHOLOGISTS

Abelson, H. H. *The improvement of intelligence testing.* New York, Teachers College, Columbia Univ., 1927. 71 pp. (Contributions to education, no. 273) Cloth, $1.50. Paper, $1.25.

Cameron, E. H. *Educational psychology.* New York, Century, 1927. 467 pp. $2.50.

Cunningham, K. S. *The measurement of early levels of intelligence.* New York, Teachers College, Columbia Univ., 1927. 74 pp. (Contributions to education, no. 259) Cloth, $1.50. Paper, $1.25.

Gradler, F. A. *Psychology and technique of cheer-leading; a handbook for cheer-leaders.* Menomonie, Wis., Menomonie Athletic Book Supply Co., 1927. 77 pp. $ .50.

BOOKS FOR TEACHERS AND SUPERVISORS

Charters, W. W. *The teaching of ideals.* New York, Macmillan, 1927. 372 pp. $2.00.